DEPARTMENT OF EDUCATION AND SCIENCE

NATIONAL ADVISORY COUNCIL ON EDUCATION FOR INDUSTRY AND COMMERCE

Report of the Committee on Technician Courses and Examinations

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NATIONAL ADVISORY COUNCIL ON EDUCATION FOR INDUSTRY AND COMMERCE

COMMITTEE ON TECHNICIAN COURSES AND EXAMINATIONS

LIST OF MEMBERS

Chairman

Dr H L Haslegrave

Members

D B Bartlett Esq	Chief Education Officer, Southend-on-Sea
*A W Chisholm Esq	Principal, Clydebank Technical College
J Cotterell Esq	Principal, Llandaff Technical College
J Crawford Esq (Until March 1968)	General Secretary, National Association of Colliery Overmen, Deputies and Shotfirers
W F Crick Esq CBE	Chairman, Business Studies Board, The Council for National Academic Awards
D B Edwards Esq	Vice-Principal and Head of Mathematics Department, Rotherham College of Technology
R Gregson Esq (From April 1968) (deceased August 1968)	General Secretary, National Union of Boot and Shoe Operatives
Dr M Hutton	Rector, Sunderland Polytechnic
E R L Lewis Esq	Controller of Education, English Electric Company
F Metcalfe Esq	Chief Education and Training Officer, Engineering Industry Training Board
J McHugh Esq MBE	Vice-Principal and Head of Department of Commerce, York Central College of Further Education
L S Newton Esq	Director, Ceramics, Glass and Mineral Products Industry Training Board
Dr J T Young	Principal, Warley College of Technology

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*As the pattern of courses and examinations is broadly similar in Scotland, it was agreed that Mr. Chisholm should be co-opted as a Scottish member to take into account experience there and to act as a link with the review which the Scottish Technical Education Consultative Council is putting in hand.

Assessors from the Scottish Education Department also attended.

Secretary

Mr F L Caughlin	Department of Education and Science

Assessors

Mr J A R Pimlott (until January 1969)	Department of Education and Science
Mr D E Lloyd Jones (from February 1969)	
Mr H Jordan	
Mr H W French HMI	
Mr F H Perkins O.B.E.	Department of Employment and Productivity
Mr T H McLean	Scottish Education Department
Dr J G Strachan HMI (until July 1968)	
Mr W S Gray HMI (from September 1968)	

LIST OF ABBREVIATIONS

The following abbreviations are used throughout the Report:

Abbreviation	*Full Title*	*First Reference in Paragraph No*
BEC	Business Education Council	165
CEI	Council of Engineering Institutions	74
CGLI	City and Guilds of London Institute	28
CNAA	Council for National Academic Awards	74
COS	Certificate in Office Studies	49
CSE	Certificate of Secondary Education	41
CTEB	Council of Technical Examining Bodies	138
DEP	Department of Employment and Productivity	19
DES	Department of Education and Science	61
'G' Course	General Course	26
GCE	General Certificate of Education	36
HCOS	Higher Certificate in Office Studies	48
HNC	Higher National Certificate	42
HND	Higher National Diploma	51
HTC	Higher Technician Certificate	216
HTD	Higher Technician Diploma	216
ITB	Industry Training Board	5
NACEIC	National Advisory Council on Education for Industry and Commerce	196
ONC	Ordinary National Certificate	26
OND	Ordinary National Diploma	26
RAC	Regional Advisory Council	204
REB	Regional Examining Body	28
SED	Scottish Education Department	61
SANCAD	Scottish Association for National Certificates and Diplomas	162
SCCAPE	Scottish Council for Commercial, Administrative and Professional Education	162
T	Technician	26
TC	Technician Certificate	216
TD	Technician Diploma	216
TEC	Technician Education Council	165

NATIONAL ADVISORY COUNCIL ON EDUCATION FOR INDUSTRY AND COMMERCE

REPORT OF THE COMMITTEE ON TECHNICIAN COURSES AND EXAMINATIONS

FOREWORD

In May 1967 the Secretary of State for Education and Science invited the National Advisory Council to review the national pattern and organisation of technician courses and examinations. This he felt to be necessary in view of the number of important related developments which had taken place since the 1961 White Paper "Better Opportunities in Technical Education".* The Secretary of State drew attention in particular to the implications of the Industrial Training Act and the subsequent establishment of industrial training boards; to the work of the Council for National Academic Awards; and to the tendency in some cases for higher national certificates to become primarily high grade technician qualifications in their own right and less routes to professional status.

We were appointed by the National Advisory Council in September 1967 "to review the provision for courses suitable for technicians at all levels (including corresponding grades in non-technical occupations) and to consider what changes are desirable in the present structure of courses and examinations".

Scope of Enquiry

We regarded our terms of reference as extending only to courses and examinations of a national character. By this we mean those leading to technician and comparable certificates of the City and Guilds of London Institute or the six Regional Examining Bodies, and to ordinary and higher national certificates and diplomas; and, since they are offered on a national basis and have a direct connection with the foregoing, certain pre-technician courses and examinations, notably the General course and that for the Certificate in Office Studies. We did not regard individual college courses or those leading to examinations of professional and similar bodies as coming within our terms of reference, although we have taken full account in our deliberations of the impact, actual and potential, of relevant professional requirements on the national courses referred to above.

We have not concerned ourselves with the number and location of technician courses, the future level of demand from technician students and the logistics of meeting it, or with the detailed content of the courses, but rather with the broad pattern of courses and machinery at national and regional level for administering it. For example, we made no attempt to review individual City and Guilds or national certificate schemes, but we considered what the place of these and other schemes should be in an up to date and forward looking system of education for technicians, and whether there should be broad changes in such respects as course entry standards, duration and administration.

Acknowledgements

In the course of our enquiry we sought the views of national organisations in industry and commerce, including the industrial training boards; of representative bodies concerned with colleges and the principals and teachers who work in them; of bodies responsible for course syllabuses and examinations for technicians; of technician students; and of a number of individual undertakings engaged in a wide range of industrial and commercial activities. The response from all quarters was gratifying, and indicative of the widespread current interest in technicians and their education and training. We received more than 180 written submissions of evidence, including a number from individuals, and met a large number of people, in a personal or representative capacity, for detailed discussions on particular aspects of our enquiry. The information and views we obtained in this way were of great help to us, and we cordially acknowledge our debt to all concerned. Their names are listed in Appendix No. 1.

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*Cmnd. 1254

PART I —THE PRESENT SITUATION

Chapter I — INTRODUCTION

1. It would, we think, be appropriate for us to preface this report with some discussion of the term "technician" and of how far it is applied in the various sectors of industry and commerce in this country for the purpose, among others, of evolving suitable programmes of education and training.

Definition of Technician

2. There have been a number of different definitions of the term "technician", varying in authority and refinement, and often related to particular industries or fields of work. We know of no single universally applicable definition of the term, nor did we attempt ourselves to devise one, since we felt that this would have been an exercise in trying to define the indefinable. As a working definition we adopted the description prepared by the Committee on Manpower Resources for Science and Technology and used in their report on the 1965 Triennial Scientific Manpower Survey. This description is as follows:

> "Technicians and other technical supporting staff occupy a position between that of the qualified scientist, engineer or technologist on the one hand, and the skilled foreman or craftsman or operative on the other. Their education and specialised skills enable them to exercise technical judgment. By this is meant an understanding, by reference to general principles, of the reasons for and the purposes of their work, rather than a reliance solely on established practices or accumulated skills".

Arising from this description we accepted that throughout industry there is a broad spectrum of occupations between the technologist or equivalent professional man on the one hand, and the skilled craftsman or operative on the other; and that while there is an immense variety in the content of these occupations and the degree of expertise needed for them, the people who fill them can be broadly classified as "technicians" for our purposes.

3. While this definition was generally acceptable to those we consulted in industry, the professional bodies in science and technology, and educational interests, it appeared too "technical" to professional bodies and others in commerce and business and non-technical sectors generally. For the most part, however, they too recognised that there are in their particular fields persons occupying jobs comparable, so far as requirements of intellect, training, education and competence are concerned, with those held by technicians in industrial sectors. Indeed, already there are proposals to create a grade of "technician" in the accountancy profession, and similar nomenclature may be appropriate in other cases where a professional support grade of staff is established. The rapid spread of computers and automatic data processing machines in the commercial side of industrial enterprises, and in the business community itself, may well encourage the use of the term "technician" to refer to some of the employees who work with these machines. In sectors such as hotel and catering, the nature of the work may well be "technical" rather than "commercial" and some occupations in these sectors may attract the appellation "technician" as naturally as some in technical sectors.

4. We have no desire nor do we see any good reason to try to get non-technical sectors to adopt the description "technician" if they think it inappropriate in their circumstances. No doubt someone will in time suggest a different and more apt term for comparable people in business and commerce. But so that there should be no doubt as to the level of person in the non-technical sectors with whom our report is concerned, we add the following definition of a person engaged at technician-level work in these sectors:—

> "One who has acquired detailed knowledge and skills in one specialist field, or knowledge and skill to a lesser degree in more than one specialist field; is required to exercise judgment, in the sense of both diagnosis and appraisal, and initiative in his work; is frequently called upon to supervise the work of others; and has an appreciation of the environment beyond the immediate limits of his duties".

We trust that the two foregoing descriptions, taken together, will clarify the range of employment in both industry and commerce that we cover when we refer in this report to "technician and comparable occupations". We should also like to make it clear at the outset that this expression is used throughout our report as applying to both men and women, and that, where it appears to have a masculine connotation only, this is simply the result of avoiding cumbersome repetition.

5. The fact that we shall have more to say about technicians in industry than about comparable employees in non-technical sectors must not be taken as indicating that we have under-rated the importance of the latter (who have been growing rapidly in terms of relative numbers). It is due rather to the fact that education and training in the business sector have not yet crystallised into as clear a pattern as in manufacturing industry, that the historical development of professional education has been different, and that the industrial training boards (ITBs) have so far had relatively little influence in the non-technical sector. Bound up with all this is the fact that, as indicated later, the evidence we received from the non-technical sector was modest by comparison with that from the industrial side. We have, however, gathered such information as was available, and drawn from it such conclusions as we have felt justified in putting forward for further and deeper examination and discussion.

Concept of Technician

6. The 1961 White Paper foreshadowed the Committee on Manpower Resources by describing technicians, for whom it proposed special courses, as occupying intermediate positions between the craftsman and the professional man. The use of the term in this sense, i.e. to cover a wide span of occupations in all branches of industry and commerce which require broadly similar attributes of intellect and competence, is relatively recent and, outside educational and training circles and a number of others concerned with personnel, far from general. Indeed, in many sectors of industry and over practically the whole range of business and administrative activities, the term is never employed in referring to any occupation. Even in sectors where it is coming into much more common use, it is more readily understood and applied in some than in others.

7. Thus, in the engineering and associated industries, where the concept of the technician in the sense we are discussing it first arose, references to "technicians" to describe persons holding intermediate-level jobs are becoming more

common, and the category is being increasingly recognised for what it is, a position (or more accurately a range of positions) in the hierarchy of skills and functions which is quite distinct from the craftsman or the professional man. The term "technician engineer" is being widely adopted to designate persons with the higher qualifications in this field.

8. In a number of other industries the concept of the technician as a distinct entity in his own right is beginning to emerge. This is not merely a matter of new occupations being created, although this is an important factor in the situation in all industries. The jobs now being identified and designated as technician jobs have been done in these industries for a long time past; it is only now that the industries are beginning to accept that the people doing them are technicians, and to think of them and describe them as such.

9. An earlier stage in this evolutionary process is represented by the industries where, although technician jobs have long been done, the persons doing them are still not identified and described as technicians. In these sectors the concept of the technician as someone inherently different from the craftsman or professional man has not yet taken root.

10. We trust that the time is not too far ahead when this concept will be readily understood and accepted in all branches of industry and commerce, and the persons doing intermediate-level jobs will where appropriate be described as technicians. We say "where appropriate" because we realise that there will always be sectors, especially in commerce and the commercial sides of industrial undertakings, where the term "technician" will not, for a variety of reasons, be acceptable either to employers or to those employed. It is, however, the concept and not so much the nomenclature which is of first importance.

Identification of Technicians

11. An increasing number of technicians hold national educational qualifications through having succeeded in one or other of the wide range of technician and comparable courses now available, and there is a tendency in some quarters to identify technicians by reference only to educational courses they have taken. This, we are sure, is wrong at a time when a very large part—probably still the majority—of the country's body of technicians have no relevant educational qualification at all. Technicians must be identified in the first place by the function they perform; if they also hold appropriate educational qualifications in particular cases, this is a decided advantage. It not only serves to confirm their technician status but indicates that they have undertaken an educational course as part of the preparation for the job. We are convinced, however, that the initial classification of a particular function as a technician function must rest on job analysis. Such analysis will, among other things, form the basis for evolving the programme of training needed to prepare a person to perform the function; the training programme will in turn indicate the kind of further education course and qualification which ideally should be held by that particular technician.

12. In saying this, however, we start from the proposition that all technicians in training must be given the opportunity of following the further education appropriate to their jobs for as long as they are able to benefit from it. We regret that so many of those now doing technician jobs have never had this

opportunity because, good as they may be, they would have been all the better for further education.

13. As the concept of the technician spreads throughout industry and commerce (whatever the terminology used to describe him in areas where "technician" itself is not appropriate); as his identification comes to be firmly based on an analysis of his function; as training and further education specifically designed to meet his needs become the order of the day, we shall increasingly reach the point where it will be unthinkable for a person to be considered fully qualified to do a technician job unless he has had the training and taken the further educational qualification deemed appropriate for the case.

14. Clearly, a considerable task of job analysis must be undertaken as a first step towards this ideal state of affairs. In our view the ITBs must accept the major responsibility for seeing that this is done. For areas outside the scope of boards it will be for the body recognised as generally responsible for training to ensure that the task is carried out. A good deal of work in this direction has already been done by training boards and some other organisations, but much more remains to be done. We hope that in doing it, there will be full co-operation with the further education service, both in prescribing suitable courses for technicians of various kinds, and in analysing jobs and devising training programmes. Real success can only come from a joint effort of this kind.

15. It is going to take time before all technician jobs and their non-technical counterparts have been identified by analysis, and appropriate training and educational programmes devised. We realise that the pace of development is going to vary from one sector of industry and commerce to another, and that meanwhile the training and education of technicians must be carried on as effectively as possible. It is for these reasons that our main pre-occupation has been to ensure as far as possible that the administrative machinery we recommend for technician and comparable courses and examinations should be such as to (i) retain all that is best in the existing structure; (ii) review and revise with all possible speed those parts of it which seem to us to require attention; (iii) adapt it readily in response to the needs of the different sectors of industry and commerce as these emerge over the coming years; and (iv) maintain close contact between those who educate the technicians, those in industry and commerce who employ and train them, and the technicians themselves through their representative organisations.

The Number and Functions of Technicians

16. We have already said that we were not concerned with the future level of demand from technician students for courses. This subject was not within our terms of reference. Nor were we concerned as a committee with the future needs of industry and commerce for technicians and comparable categories of employees. But we felt we would do less than justice to our remit if we did not stress just how important, numerically and otherwise, is that part of the country's qualified manpower with which we were concerned.

17. The 1965 Triennial Survey of Scientific and Technological Manpower revealed that in the sectors surveyed there were then 622,000 technicians and other technical supporting staff, of whom nearly 400,000 were in manufacturing industry, 72,000 in the public sector of industry, 46,000 in construction, and

89,000 in central government and local government. Nearly 100,000 of the national total were engaged in research and development, and more than two-thirds of these were in industry. Employers in the sectors surveyed estimated that they would need over 700,000 technicians by 1968.

18. The corresponding information just available from the 1968 Survey indicates the general rate of growth in the number of technicians. This shows that in that year 710,000 persons were employed as technicians and other technical supporting staff in the sectors surveyed, an increase of 88,000 or over 14 per cent on the 1965 total. Of these, 454,000 were employed in manufacturing industry, 84,000 in the public sector of industry, 61,000 in construction and 91,000 in central and local government. Over 106,000 of the national total were engaged in research and development, and just under three-quarters of these were in the manufacturing industries. Employers in the sectors surveyed estimated that they would need nearly 780,000 technicians by 1971, i.e. an additional 70,000 over those in employment in January 1968.

19. There is still a need for more detailed information about the numbers currently employed in the most important categories of technician jobs, and about the level of future demand. We are therefore glad to know that a number of ITBs are carrying out surveys, in collaboration with the Manpower Research Unit of the Department of Employment and Productivity (DEP), to establish in greater detail the extent of the existing stock of technicians and technical supporting staff, and the level of future demand in their respective industries. These should reinforce the information obtained through the 1965 and 1968 Triennial Surveys. In addition, a fuller analysis of the information obtained by the 1968 Survey should soon be available. But the figures already quoted leave no doubt that, quantitatively, technicians form a very important part of our highly-trained manpower.

20. This importance is enhanced when the nature of the functions they perform is looked at, even superficially. It has been said that technicians never make things, but that they make everything work. There is more than a grain of truth in this. They are employed in an immense variety of roles in industry and the public service; in assisting research and development; in draughtsmanship, design, instrumentation and control of various kinds, computer programming, servicing and maintenance, method and work study, quality control, estimating, rate fixing, technical writing, inspection, and increasingly, too, on supervision. It would be almost impossible to give anything like a complete catalogue of technician occupations since new ones are continually emerging and developing.

21. In business and other non-technical fields, too, the technicians' counterparts carry out a wide variety of functions between the professional man or director or departmental manager at one end, and the routine clerk or sales assistant at the other. As in industry, there is a certain amount of overlap at each end. Indeed, in the case of small firms, in both industry and business, the employment structure is often such as to prevent clear-cut differentiation between the functions carried out by individuals, and what we would regard as technician or comparable functions are often carried out by persons called "managers" or "proprietors". It is certain, however, that in business just as in industry there are considerable and growing numbers of middle-grade personnel

who need their own kind of training and education, and just as there is a variety of technicians in industry, both in function and in level, so also is there a similar variety to be found in their non-industrial counterparts.

22. There is still much to be learned about technicians and comparable workers in industry and commerce. In many instances their own employers have yet to recognise the distinctive nature of their jobs; in just as many cases the individuals themselves have yet consciously to realise that they are members of a segment of the country's skilled manpower who need specific attributes of intellect, skill and experience to do their jobs and who also need a training and education programme different from that undertaken by those who work above or below them. But enough is known to recognise that the work technicians do in maintaining the industry and commerce of the country, indeed the whole fabric of its society, is of first-rate importance, and that their education, training and status should reflect this.

Status of the Technician

23. Here we have strayed on to territory which is strictly outside our terms of reference, but we were impressed by the weight of evidence we received of the need to accord an appropriate and recognised status to the technician. It is, of course, acknowledged that the main task of establishing this is one for industry and commerce, assisted and encouraged by the professional and technician associations.

24. As in other fields, however, the existence of nationally-recognised educational qualifications may be able to make some contribution to considerations of status for technicians. In this connection we do not think we can do better than quote from the speech with which the Minister of State for Education and Science closed the 1966 Commonwealth Conference on the Education and Training of Technicians:

> "I am very glad to know that the Conference attached critical importance to ensuring a proper status for the technician. We should have no quarrel with status, only with status symbols. To quote from one of a series of excellent papers '. . . the technician is neither a superior tradesman nor a depressed technologist.' It is indeed essential that the technician be accorded a status of his own, that he feel himself to be a member of a body with an ethos of its own, a body of men—and women—who have wanted to become technicians rather than anything else, who have been selected as having the right qualities for a technician, who have had the education and training appropriate to a technician, and who are proud to bear the title of 'technician'.
>
> "One certain way of helping to achieve this status is to ensure that the relevant programmes of training and education are 'custom-built' for technicians, deriving neither from craft courses 'plus' nor from technologist courses 'minus'. The programmes must have their own integrity".

We have borne this in mind during our deliberations, and we trust that the recommendations we have made will be helpful not only to those who devise and administer further education and training programmes for the technician, but also to those—and they are often the same people—who are concerned to see that he is given his rightful place in our modern society.

Chapter II — THE 1961 WHITE PAPER AND THE STEPS TAKEN TO IMPLEMENT ITS PROPOSALS

25. The 1961 White Paper "Better Opportunities in Technical Education" contained proposals for "a major reconstruction of the system of courses for technicians, craftsmen, and operatives in the technical colleges of England and Wales". The proposed changes had four main objectives, namely, to broaden the students' education and provide maximum continuity between school and technical college; to adapt the system more closely to the needs of industry; to increase the variety of courses available for students; and to reduce substantially the wastage resulting from the failure of many students to complete their courses successfully.

26. The general intention of the White Paper was to establish a system, or reinforce what already existed in the system, by which more students could become qualified as technicians through a wider range of courses suited to industrial needs. The principal proposals for achieving this were:

(a) there should continue to be national certificate and diploma courses for students aiming to become higher technicians, but ordinary national certificate (ONC) courses should last two instead of three years and the standard of entry to ONC and ordinary national diploma (OND) courses should be raised;

(b) new courses of four or five years should be devised specially for technicians;

(c) new courses, to be known as General courses and leading to ONC/D or Technician courses, should be introduced; and

(d) more time should be provided for day release, while block release and sandwich courses should be increasingly developed.

In the remainder of this report, General courses (which are described in paragraphs 28-29) are referred to as G courses, while Technician courses (which are described in paragraphs 30-34) are referred to as T courses.

The Courses Provided and Taken Up

27. Since 1961 there have been large-scale changes in the further education facilities available to trainee technicians. G courses have been made available in many areas of study. There has been a vigorous response by colleges and examining bodies to the White Paper's recommendations for the provision of more courses and examinations. While enrolments on some national certificate and diploma courses have shown the effects of increasing numbers either staying in full-time education at school or seeking one of the new T qualifications, the courses themselves have been marked by radical re-appraisals of their structure and the establishment of common fields of study between different subjects. In some areas where the concept of the technician has been slow to take hold, important developments along similar lines are beginning to become apparent.

G Courses

28. G courses are designed for school leavers of 15 or 16 who show promise of being able to qualify as technicians. They are either part-time day or block release courses spread over one or two years. In the case of 15-year old students

taking the two year course, transfer can be effected at the end of the first year to a T course or the more promising can, at the end of a second year, enter the second year of a T course or the first year of an ONC course. Students leaving school at 16 take a one-year G course, at the end of which they go either to the second year of a T course or the first year of the ONC. G course examinations are externally administered by the City and Guilds of London Institute (CGLI) and the six Regional Examining Bodies (REBs).

29. G courses have two main functions. Their first aim is to establish the necessary degree of proficiency in the "foundation" subjects required for adequate progress on a technician course. Secondly, they have a diagnostic (or more properly, prognostic) function of helping the student and the college to determine the best course for the student to take. Courses are now offered in engineering; textiles; shipbuilding; science; construction; mining and printing. Table 1 shows for the period 1963-1968 inclusive the number of candidates taking G course examinations and thereby qualifying for entry to the first year of the ONC or the second year of a T course.

"*End-on*" *T Courses*

30. In some sectors of industry the normal method of recruitment of certain kinds of technician is by selection from those who have completed craft training with a performance above the average. The work of these technicians remains closely allied to and requires a detailed knowledge of the craft work, although it is of course at a higher technical level and involves greater responsibility. The White Paper recognised that a craft course followed by a related technician course would continue to constitute a sufficient educational preparation for technicians of this kind. Such technician courses are referred to in this report as "end-on T courses".

31. In 1961 there were 23 CGLI schemes for end-on T courses. By 1968 these were 26 in number, including courses in sectors such as agriculture and agricultural engineering; building; clothing, footwear and leather; electrical engineering; food technology and catering; furniture; gas, electricity and water; mechanical engineering; and shipbuilding. The full CGLI list of such schemes is given in Appendix No. 2.

32. There is no "normal" age of entry into these courses. Depending on the prior course of study taken by the person concerned, the age of entry may range between 18 and 25. The extent of prior studies has an important effect on the structure of the "end-on" T course itself. In some cases a day or block release course lasting between one and two years is recommended while in others, especially if the student is of more mature years, the scheme can be arranged as a series of single subjects, which can be studied individually over an extended period of time.

"*Ab Initio*" *T Courses*

33. The specially-devised courses for technicians recommended in the White Paper are known generally as "ab initio" T courses, because they are designed to meet the specific educational needs of technicians in particular occupations, and have technician characteristics from the outset. While the precise form of each course is settled industry by industry, the entry standard is at a common

Table 1

General Courses, Numbers of Candidates and Numbers Qualified to Enter 01 and T2*

Subject	1963					1964					1965					1966					1967					1968				
	Total candidates taking 'G' course final examintions	Nos. Qualifying for				Total candidates taking 'G' course final examintions	Nos. Qualifying for				Total candidates taking 'G' course final examintions	Nos. Qualifying for				Total candidates taking 'G' course final examinations	Nos. Qualifying for				Total candidates taking 'G' course final examinations	Nos. Qualifying for				Total candidates taking 'G' course final examinations	Nos. Qualifying for			
		01		T2			01		T2			01		T2			01		T2			01		T2			01		T2	
		No.	%	No.	%		No.	%	No.	%		No.	%	No.	%		No.	%	No.	%		No.	%	No.	%		No.	%	No.	%
cience											2,111	851	40	654	31	1,901	729	38	569	30	1,796	680	38	546	30	1,501	595	40	432	29
ngineering	15,454	3,942	26	6,080	39	14,657	5,460	37	5,541	38	14,210	5,699	40	5,485	39	14,351	5,065	35	5,568	39	12,851	4,265	32	5,081	40	11,423	4,216	37	4,174	37
nstruction											1,880	716	38	686	37	2,350	932	40	839	36	2,033	742	35	776	38	1,950	722	37	756	39
ipbuilding						46	17	37	20	44	106	33	31	32	30	68	31	46	27	40	74	6	8	24	32	63	11	17	14	22
ting																					357	117	33	111	31	236	55	23	77	33
tiles	18	2	11	8	44	97	37	38	26	27	125	39	31	51	42	121	52	43	41	34	127	40	31	57	45	116	57	49	33	28
ining											777	298	38	*288	37	804	342	43	*303	37	669	277	40	*257	38	503	211	42	*171	34
l Subjects	15,472	3,944	25	6,088	40	14,800	5,514	37	5,587	38	19,209	7,636	39	7,196	38	19,595	7,151	36	7,347	37	17,907	6,127	34	6,852	38	15,792	5,867	37	5,657	36
otal numbers of udents Qualifying		10,032		65%			11,101		75%			14,832		77%			14,498		74%			12,979		72%			11,524		73%	

**Note:* Successful candidates in the final mining 'G' course examinations qualify for entry into the T1 year of a Mining Technicians' course.

level, i.e. the attainment of a satisfactory standard after a five-year secondary school course, or the satisfactory completion of a G course as described above. The courses are part-time, and usually require four years of study with, in some cases, the possibility of a further year or two leading to a higher qualification.

34. In 1961 there were two such courses in existence. A third was at that time almost ready for introduction, and others were being discussed with industry. At present there are over 90 ab initio T courses in 13 widely varying groups of subjects. The full CGLI list is shown in Appendix No. 3. This Appendix also shows the rapid increase in the numbers of students qualifying for technician certificates by this method in each group since 1962.

National Certificate and Diploma Courses

35. The main proposals in the White Paper affecting ONC courses were the raising of entry standards and the reduction of the course from three to two years. The White Paper described how the courses served the two distinct purposes of providing qualifications in their own right for different grades of technicians, and of providing a route to professional qualifications.

36. Since 1961 several developments, some foreshadowed by the White Paper, have taken place. The national certificates continue as a main line of approach to qualifications for technicians for those unable to take full-time or sandwich courses. There have been changes in the relationship between ONCs and ONDs. The OND, which requires a greater breadth of approach than the ONC, is tending to become an alternative to "A" level of the GCE for full-time students. All except the ONC evening students take a two rather than a three-year course. There have been adjustments to the coverage of the different ONC and OND courses so that large common areas are covered by a single course as in engineering, science and construction.

37. Table 2 shows the numbers of students taking and passing national certificate and diploma examinations in the technical sector in the years 1960-1968. It also indicates the growth in the number of subjects for which these qualifications can now be taken, and the trend towards "common" schemes within the engineering and science group of subjects. It will be seen that the number of candidates for the ONC has fallen off. The reasons for this are the reduction since 1963 in the size of the age group concerned; the tendency of more students within the age group to stay on in full-time education either in school or in college; and, perhaps most interesting from the point of view of the White Paper proposals, the development of alternatives in the form of the ab initio T courses. It had, of course, been foreseen that, leaving aside the demographic factor, the introduction of T courses would have the effect of reducing recruitment to the ONC.

Selection and Wastage

38. The "wastage" of students is a continuing problem which the White Paper tried to meet. It is an accepted aim of the system that it should attract and keep in further education the maximum number of young people able to benefit from courses leading to technician qualifications. The proportion who successfully complete a full course is not the sole criterion of success. Some who have tried but failed will be better equipped as a result of the tuition they received while making the attempt. But, where possible, prognosis should be

Table 2 (*Continued overleaf*)

Students Taking and Passing National Certificate and Diploma Examinations (Technical Sector) 1960-1968

Subject		ONC									OND								
		1960	1961	1962	1963	1964	1965	1966	1967	1968	1960	1961	1962	1963	1964	1965	1966	1967	1968
Building	Entries	2,661	2,719	3,166	3,771	3,949	3,904	4,778	2,776	2,630	224	293	329	341	477	612	691	530	499
	Passes	1,658	1,764	2,004	2,292	2,494	2,310	3,080	1,718	1,632	154	190	216	224	309	415	439	388	365
Mechanical	Entries	18,841	18,896	18,095	19,017	19,511	3,521	—	—	—	555	570	512	491	578	519	—	—	—
Engineering	Passes	8,244	8,787	8,791	9,082	9,609	1,765	—	—	—	319	340	340	284	346	304	—	—	—
Electrical	Entries	8,415	8,901	9,433	9,523	10,741	1,897	—	—	—	34	58	35	31	23	—	—	—	—
Engineering	Passes	4,383	4,661	4,956	5,260	5,974	974	—	—	—	27	31	26	19	19	—	—	—	—
Engineering	Entries	—	—	—	—	—	13,307	15,302	15,838	15,261	—	—	89	318	423	672	1,081	1,319	1,637
	Passes	—	—	—	—	—	7,749	9,794	9,799	9,452	—	—	57	218	306	480	786	903	1,107
Production	Entries	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Engineering	Passes	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Aeronautical	Entries	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Engineering	Passes	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Civil Engineering	Entries	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	Passes	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Chemical	Entries	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Engineering	Passes	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Chemistry	Entries	2,819	3,019	3,374	3,500	3,425	3,253	3,193	662	74	—	—	—	—	—	—	—	—	—
(+ Applied)	Passes	1,391	1,533	1,713	1,700	1,756	1,751	1,752	415	54	—	—	—	—	—	—	—	—	—
Physics	Entries	871	935	986	949	829	714	633	80	—	—	—	—	—	—	—	—	—	—
Applied	Passes	557	656	654	609	557	459	459	53	—	—	—	—	—	—	—	—	—	—
Biology	Entries	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Applied	Passes	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Sciences	Entries	—	—	—	—	—	—	—	2,927	4,274	—	—	—	—	—	—	—	73	143
	Passes	—	—	—	—	—	—	—	1,793	2,689	—	—	—	—	—	—	—	54	107
Metallurgy	Entries	743	732	681	761	679	544	573	124	—	—	—	—	—	—	—	—	—	—
	Passes	368	375	381	424	370	294	325	78	—	—	—	—	—	—	—	—	—	—
Foundry	Entries	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Techy	Passes	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Mining and	Entries	1,314	1,027	792	832	895	750	739	175	191	—	—	—	—	—	—	—	—	—
Mine Surveying	Passes	777	576	444	493	506	425	423	113	128	—	—	—	—	—	—	—	—	—
Textiles	Entries	179	166	193	164	188	185	161	116	138	—	—	—	—	—	—	45	69	75
	Passes	103	100	144	117	170	132	97	50	65	—	—	—	—	—	—	23	45	40
Naval	Entries	267	242	166	185	203	198	138	125	163	—	—	—	—	—	—	—	—	—
Architecture	Passes	99	114	84	90	90	90	61	69	116	—	—	—	—	—	—	—	—	—
Nautical	Entries	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	75	90
Science	Passes	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	47	64
TOTALS	Entries	36,110	36,637	36,886	38,702	40,420	28,273	25,517	22,823	22,731	813	921	965	1,181	1,501	1,803	1,817	2,066	2,444
	Passes	17,580	18,566	19,171	20,067	21,526	15,949	15,991	14,088	14,136	500	561	639	745	980	1,199	1,248	1,437	1,683

Table 2—*contd.*

Subject		HNC									HND								
		1960	1961	1962	1963	1964	1965	1966	1967	1968	1960	1961	1962	1963	1964	1965	1966	1967	1968
Building	Entries	1,305	1,431	1,431	1,740	1,772	2,165	2,505	2,627	3,275	93	95	124	144	129	143	225	345	377
	Passes	1,034	1,167	1,053	1,335	1,405	1,629	1,905	2,061	2,784	76	75	99	122	114	127	178	258	337
Mechanical Engineering	Entries	6,816	7,001	6,191	6,241	6,628	6,666	6,708	6,074	5,174	594	612	571	675	748	842	972	1,217	1,241
	Passes	4,335	4,493	3,932	4,040	4,018	4,011	4,059	3,889	3,416	514	512	464	586	655	732	804	990	1,035
Electrical Engineering	Entries	3,753	4,106	4,080	4,461	4,476	5,358	5,321	4,901	5,250	270	375	321	278	436	540	664	699	756
	Passes	2,512	2,742	2,537	2,833	2,818	3,118	3,287	3,070	3,024	256	308	282	209	333	407	549	559	603
Engineering	Entries	—	—	—	—	—	—	—	—	203	—	—	—	—	—	—	—	—	—
	Passes	—	—	—	—	—	—	—	—	175	—	—	—	—	—	—	—	—	—
Production Engineering	Entries	736	676	689	761	825	1,089	1,211	1,072	1,034	11	27	37	34	38	78	120	156	152
	Passes	636	567	546	608	648	850	924	849	845	8	24	31	32	32	74	114	145	141
Aeronautical Engineering	Entries	14	28	49	33	33	29	44	24	14	—	10	7	13	4	8	13	11	5
	Passes	11	14	29	15	26	14	33	13	10	—	10	4	13	4	7	11	11	5
Civil Engineering	Entries	569	731	753	811	936	1,200	980	836	680	—	—	—	—	—	—	—	—	—
	Passes	357	432	541	572	700	900	768	604	518	—	—	—	—	—	—	—	—	—
Chemical Engineering	Entries	119	107	118	100	118	111	134	139	134	—	—	—	—	—	—	—	30	50
	Passes	86	78	84	64	90	72	96	97	79	—	—	—	—	—	—	—	22	37
Chemistry (+ Applied)	Entries	1,599	1,782	1,878	2,000	2,180	2,243	2,246	2,270	2,374	19	47	49	76	84	146	176	204	282
	Passes	980	1,059	1,185	1,150	1,284	1,349	1,298	1,418	1,594	9	40	33	42	60	105	136	151	197
Physics	Entries	338	433	452	520	581	504	496	458	468	—	—	—	—	13	35	40	33	55
	Passes	229	314	291	345	391	354	370	329	331	—	—	—	—	12	30	39	32	53
Applied Biology	Entries	—	—	—	—	106	243	291	355	394	—	—	—	—	—	—	—	55	111
	Passes	—	—	—	—	86	185	226	259	301	—	—	—	—	—	—	—	33	74
Applied Sciences	Entries	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	Passes	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Metallurgy	Entries	392	426	416	379	420	391	402	324	303	—	—	22	33	71	72	85	69	76
	Passes	301	324	342	298	341	315	316	240	243	—	—	20	31	67	67	72	56	65
Foundry Techy	Entries	—	—	—	—	13	26	30	28	37	—	—	—	—	—	—	—	—	11
	Passes	—	—	—	—	12	24	25	27	28	—	—	—	—	—	—	—	—	11
Mining and Mine Surveying	Entries	501	500	391	259	203	182	141	130	126	96	94	134	145	134	118	114	98	103
	Passes	334	345	294	198	151	130	97	94	83	89	85	118	130	110	106	98	79	88
Textiles	Entries	102	75	75	59	76	80	76	79	31	—	—	—	—	—	—	—	—	18
	Passes	70	69	69	54	71	71	65	76	27	—	—	—	—	—	—	—	—	18
Naval Architecture	Entries	89	73	76	98	73	95	63	82	54	—	—	—	—	—	—	—	5	6
	Passes	69	63	59	62	52	71	49	66	38	—	—	—	—	—	—	—	5	6
Nautical Science	Entries	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	Passes	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
TOTALS	Entries	16,333	17,369	16,599	17,462	18,440	20,382	20,648	19,399	19,551	1,083	1,260	1,265	1,398	1,657	1,982	2,409	2,922	3,243
	Passes	10,954	11,667	10,962	11,574	12,093	13,093	13,518	13,092	13,496	952	1,054	1,051	1,165	1,387	1,655	2,001	2,341	2,670

used to ensure that students are placed in the right course to ensure qualification.

39. The colleges and examining bodies can fairly claim to have achieved some success in these respects as follows:

(a) it is now often possible for students to transfer to a different standard of course without having to start again at the beginning of the new course. Lateral transfer of this kind has been made possible both by the reduction of artificial barriers and by the development of the large number of ab initio T courses over the last few years;

(b) students are no longer required by the joint committees or the CGLI to pass examinations—other than informal tests held by individual colleges—at the end of each year of their course. Both national certificate and T examinations are based on two or three year units with promotion from first to second year, and second to third where applicable, at the discretion of the college. Some colleges, however, use REB tests before promoting between years;

(c) there has been some relaxation of the requirements to pass in all subjects at one sitting. Most joint committees allow referment. All are now prepared to allow a good individual or overall performance in one subject to offset a marginal failure in another in order to avoid a repeat of studies. Some T examinations allow for single papers to be taken;

(d) while at some levels, notably those of the national certificates, numbers entering courses have gone down, pass rates on the whole have gone up, although this has perhaps been due in part to high in-course rejection rates, and there are exceptions to this general picture.

40. These developments have enabled adequate standards to be maintained and the variety of courses at different levels to be substantially increased. Some unnecessary barriers to technician qualifications have been removed and a number of "life-lines" have been established for those unable to complete a higher level course but competent enough for a less academically demanding one.

41. The White Paper proposed that students for technician courses should be more carefully selected and that standards of entry to ONC courses in particular should be raised. The following recommendations for pre-course selection have been put into effect:

(a) entry to ab initio T courses is based on the attainment of a satisfactory standard after a five-year secondary school course, or the satisfactory completion of a G course;

(b) entry to ONC and OND courses is confined to students possessing either

(i) four appropriate passes at GCE "O" level (or the equivalent in CSE);
(ii) completion of a G course at a standard (credit standard in certain subjects) showing a good prospect of obtaining an ONC;
(iii) qualifications denoting an equivalent standard.

Time for Study

42. At the time the White Paper was written, the minimum specified time for technician courses was 180 hours in each year, although 220 was more usual for part-time students and 280 hours for students attending on one day and one

Chapter III — DEVELOPMENTS IN THE NON-TECHNICAL SECTOR

45. In the previous chapter we described recent developments in technician courses and examinations in the areas of technical education covered by the 1961 White Paper. We now turn to courses and examinations at broadly comparable levels in business and other non-technical fields. By this we mean courses and examinations for intermediate-level personnel engaged in the commercial side of industry, in all branches of commerce itself, and in the professions related to commerce; and "commerce" in this context includes the buying, selling and distribution of goods; the export, import and service trades; and activities such as banking and insurance.

46. Although the proposals in the White Paper did not apply to business studies and other non-industrial subjects, the same principles were declared to be broadly applicable and it was the Government's hope that those concerned with these subjects would find the White Paper of assistance in planning future developments. Certainly the three main reasons given in the White Paper for reorganising the system of courses for technicians, craftsmen and operatives in technical education applied also in the non-technical sector, in which it was equally true that courses had not kept pace with changes, that adequate account had not been taken of developments in the secondary schools, and that a high proportion of the students did not complete their courses or failed to pass their examinations.

47. In fact, Government policy on further education for commerce had been announced in 1959 following the report of the Advisory Committee on Further Education for Commerce (the McMeeking Report*), and a substantial reorganisation of provision was in train in this sector when the White Paper appeared in January 1961. The main recommendations of the McMeeking Report were brought into effect in 1961 and the years that followed, and the reorganisation of further education for commerce was in fact much influenced by the principles of the White Paper. In a number of respects, therefore, courses in business and other non-industrial subjects which are taken by technician-comparable personnel resemble the corresponding courses in the technical field.

48. This is especially so at the national certificate and diploma level, where the form, length and standard of ordinary and higher national certificates and diplomas in business studies correspond closely to those in the technical sectors. Similarly, details have recently been announced of a "Higher Certificate in Office Studies" (HCOS), which might be regarded in a number of respects as a business equivalent of the T course.

49. In the non-technical sector, however, there has not been any broad and systematic development of courses and examinations for technician-comparables corresponding to the ab initio T courses which have met with such success on the technical side. In a limited number of cases new courses have been set up (for example in certain areas of computer work) or existing courses have been or are being revised and reorganised (for example in retail distribution) to produce something which is, very broadly speaking, comparable with the ab initio T course. The same broad parallel might be drawn in respect of some of the specialized "commodity" courses for which examinations are conducted by various trade and other associations in the field of retail distribution. Then, too, the course leading to the Certificate in Office Studies (COS) might be said to

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* Report of the Advisory Committee on Further Education for Commerce, 1959 (HMSO)

perform the function of a G course, in that it provides a form of diagnosis for and an outlet to the ONC in Business Studies.

50. Thus, material changes have taken place in the provision of courses and examinations for technician-level personnel in non-technical sectors, although these have not been on the same scale as those in the technical sector. A more detailed account of the principal courses, the number of enrolments on them and the numbers entering and passing the examinations from 1961-68 inclusive is given at Appendix No. 4.

51. Within the changes in the framework of national certificates and diplomas in business studies which have taken place in recent years lies a development which, while not peculiar to the business sector, is nevertheless of much more importance to the future of these courses in that sector than in any other. We refer to the growth of the exemptions system, by which most of the leading commercial professional bodies accept success at credit level in the ONC or D examination for exemption on a subject-for-subject basis from their own examination requirements at intermediate level. In one or two cases partial exemptions are offered from final professional requirements to holders of HNCs or higher national diplomas (HNDs) in business studies, although these higher national courses are designed to provide a broad education for business and not to produce specialists in any particular area of business.

hapter III — DEVELOPMENTS IN THE NON-TECHNICAL SECTOR

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9. In the non-technical sector, however, there has not been any broad and ystematic development of courses and examinations for technician-compar- bles corresponding to the ab initio T courses which have met with such success n the technical side. In a limited number of cases new courses have been set p (for example in certain areas of computer work) or existing courses have een or are being revised and reorganised (for example in retail distribution) to roduce something which is, very broadly speaking, comparable with the ab itio T course. The same broad parallel might be drawn in respect of some of e specialized "commodity" courses for which examinations are conducted by arious trade and other associations in the field of retail distribution. Then, too, e course leading to the Certificate in Office Studies (COS) might be said to

Report of the Advisory Committee on Further Education for Commerce, 1959 (HMSO) orm the function of a G course, in that it provides a form of diagnosis for an outlet to the ONC in Business Studies.

Thus, material changes have taken place in the provision of courses and ninations for technician-level personnel in non-technical sectors, although e have not been on the same scale as those in the technical sector. A more iled account of the principal courses, the number of enrolments on them the numbers entering and passing the examinations from 1961-68 inclusive ven at Appendix No. 4.

Within the changes in the framework of national certificates and diplomas business studies which have taken place in recent years lies a development ch, while not peculiar to the business sector, is nevertheless of much more ortance to the future of these courses in that sector than in any other. We r to the growth of the exemptions system, by which most of the leading nmercial professional bodies accept success at credit level in the ONC or D mination for exemption on a subject-for-subject basis from their own exination requirements at intermediate level. In one or two cases partial exptions are offered from final professional requirements to holders of HNCs higher national diplomas (HNDs) in business studies, although these higher ional courses are designed to provide a broad education for business and not produce specialists in any particular area of business.

Chapter IV — GENERAL DEVELOPMENTS SINCE 1961 AFFECTING TECHNICIAN COURSES

52. Since the publication of the White Paper 1961, there have been a number of developments, actual or prospective, in the field of training, in industry itself, and in all parts of the education system, which are bound to have far-reaching effects not only on technician courses and examinations, but also on all other areas of provision for further education. Some of the developments are already with us and have begun to make their impact on the system, although their full effect has still to be felt. Others have yet to come, and in some cases their effect can only be a matter for conjecture at this stage. Taken together, they present for the future a distinct possibility of profound changes over the whole field of further education. While their effect on technician education is of course our main concern, and must have pride of place in our discussion of them, we are nevertheless conscious that technician education is not an island, and we have kept in mind the wider background in judging how far the developments should be reflected in our recommendations.

Industrial Training Act

53. In our view the passing of the Industrial Training Act in 1964 is the most important of the developments to which we refer. The underlying assumption in the Act that training and further education are complementary aspects of a single process, an assumption reflected in the duty placed on the industrial training boards to recommend the further education to be associated with programmes of training, makes its potential impact on the further education system comparable with that of a major Education Act.

54. The Industrial Training Act involves the great majority of firms in training. No firm is obliged to train but all, with the exception of some of the smallest, must pay the levy and thereby contribute to the cost of training in their respective industries. Those who do satisfactory training may claim grant for their effort and thus offset their levy liability. But important though the levy/grant provisions of the Act are —and their application by the training boards has, perhaps naturally, focused on them more than their fair share of attention in the early years—they are no more than a means to an end.

55. The real aims of the Act are to ensure an adequate supply of well trained men and women at all levels in industry and commerce, and to secure an improvement in the quality and efficiency of industrial training. Already the very existence of the Act has increased awareness of the rewards to be obtained from good training, and there are evident signs of progressive change. The training boards, especially those set up in the early days of the Act, have already published training recommendations for many categories of employment, including technicians, in their respective industries. Increasingly the boards will in future look for a training performance which satisfies their own recommendations before they pay grant. This is leading to more systematic endeavours to provide training of the right quantity and quality for all who need it.

56. A substantial number of training advisory officers have been appointed by boards and are already at work advising firms on how to apply training recommendations; there are a great many more company training officers and instructors than there were a few years ago; enrolments on all kinds of courses of

further education, in particular those directly associated with training, are at their highest ever, as can be seen from Table 5 (overleaf). In 1967 day or other release for trainee technicians was estimated to be running at over 90% of the total in one or two main industries, including engineering, and bidding fair to reach this proportion in others.

57. Other developments arising from the implementation of the Act are equally important, perhaps more so in that their full impact on the education service has yet to come. Training has become widely recognised as of importance to the economy and the individual, and the attitude of large numbers of individual employers towards it is changing. It has become more formalized as boards have required training records to be kept and have given guidance about skills analysis and job description for training purposes. It has become more homogeneous because boards, working as they do within the same administrative framework and following the same broad principles, make training recommendations which follow broadly similar patterns. Indeed, specific arrangements* have been made for joint board committees to consider training matters affecting occupations common to more than one board, and the Central Training Council has also issued guidance to boards relating to training for a number of common occupations.

58. Perhaps the most important implication of all for the education service, outside the immediate logistical implications of how to provide for the potential increase in the number of students, arises from the need to revise existing courses and create new ones in response to the changing demands of industry and commerce as reflected in the board's training recommendations. We are well aware that further education courses have a wider role to perform than merely to provide the vocational education to match a person's vocational training, but this is nevertheless one of their most important functions.

59. In the past, further education courses have been designed, indeed have had to be designed, in the knowledge that in many instances the course was the only systematic training process the student was likely to undergo. The responsible authorities in the education service did their utmost to make the courses reflect the training needs of industry and commerce, but this was often a haphazard process through no fault of the authorities. It was in practice difficult in many cases to get industry to identify and state its real needs. The setting up of the training boards has led to changes in this situation, and we are now witnessing the institution of policies and practices which can make joint planning of industrial training and further education a reality at all levels. We have already referred to the arrangements for joint action by boards in areas of common interest, and also to the guidance offered by the Central Training Council in this respect. An important start has also been made with corresponding arrangements for consultation between boards and the bodies in further education responsible for courses and examinations.

60. These arrangements† are designed to ensure that training programmes on the one hand and associated further education courses on the other, complement and reinforce one another. They affect much more than the content of courses. Under them the whole structure of provision, including the form and

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*Central Training Council: Memorandum No. 7, March, 1968.

†D.E.S. Admin Memo 25/67
S.E.D. Memo 19/67

Table 5

Enrolments in Colleges of Further Education on Courses Leading to Recognised Qualifications 1964–1968
(England and Wales)

	Number of students enrolled on	1964–5	1965–6	1966–7	1967–8
1	All advanced courses (see Note b)	138,457	149,715	162,384	180,882
2	All non-advanced courses	839,793	878,989	916,505	945,689
3	Sandwich courses	14,055	17,206	20,712	24,780
4	Block-release courses	24,493	33,392	39,098	45,853
5	Day (including block) release courses	574,268	602,028	625,013	639,963
6	Integrated courses (estimate)	1,000	1,400	8,500	10,000
7	Introductory courses for Training Officers	76	329	752	1,249

Notes

a. The enrolments in Serials 3–7 are included with the totals of Serials 1 and 2.

b. ADVANCED COURSES are defined as: "courses followed by students undertaking post-graduate, post-diploma or research work; courses in preparation for university first and higher degrees, CNAA first and higher degrees, the Higher National Diploma or Certificate, the Diploma in Management Studies and the Diploma in Art and Design, or a final professional examination or College Diploma or Associateship if above the standard of instruction required for the Ordinary National Certificate or General Certificate of Education (Advanced level); or any course of study of an equivalent standard in the case of certain courses, the later year or years are treated as advanced and the earlier year(s) as non-advanced." (Statistics of Education, 1967, Vol. 3) length of the courses, can if necessary be changed to reflect up-to-date needs as revealed by the boards' training programmes, and the opportunity can also be taken to rationalize the system of provision so that colleges are not expected to provide a multiplicity of courses for students who, while employed in different industries, nevertheless need what is basically the same educational course to complement the training.

61. The formal joint planning arrangements so far made for educational courses affect mainly the craft and operative fields, and provide only partial coverage in respect of technician education and training. A good example of the kind of result to which they can give rise is the new system of engineering craft studies courses announced in January 1969 by the Department of Education and Science (DES) and the Scottish Education Department (SED)** These courses, to be provided in the colleges from September 1969 onwards, have been designed to match the vastly changed pattern of training for engineering craftsmen which has arisen from the recommendations of the Engineering Industry Training Board, and they are a considerable departure, both in content and in structure, from the courses provided until now. And as other boards with appreciable numbers of engineering craftsmen within their scope have been involved in the consultations covering both the training and education sides of the programme, the new courses meet their requirements too.

62. Thus, the joint planning arrangements can produce courses which are not only educationally sound, but also reflect the latest training needs of industry as defined by an authoritative source, the training boards. They also offer the opportunity of relieving further education syllabuses of an element, in some cases a substantial one, of practical training formerly included because there could be no certainty that the student would get it in his job. This kind of training should now take its rightful place in the practical training programme recommended by the board, and this in turn offers in some cases the prospect of more time for further education proper without necessarily calling on more release from work and putting a consequent additional strain on educational resources.

63. In this necessarily brief look at the Industrial Training Act, we have tried to indicate something of the potential that lies within it for encouraging increased attendance at courses of further education at technician and other levels; and for altering the content, form and length of courses so that they meet modern needs and training practices. In our view the ultimate effect on further education will be far-reaching and most of the important developments in the system in the foreseeable future are likely to have their genesis in the Act, or at least to owe much to the fact of its existence. In the field of technician education with which we are particularly concerned, the circumstances that face us are very different indeed from what they were in 1961 principally because of the existence of the Act, and it is for this reason that references to it and to the training boards, the instruments of its implementation, figure so largely in our report.

**D.E.S. Admin Memo 2/69
S.E.D. Memo 2/69

Other Changes in the Approach to Training and Education

64. There is little doubt that there has been a considerable change in the general attitude to training. Its fundamental importance for the nation as a whole is more clearly recognised than at any time in the past, and individual employers are seen to have some responsibility for ensuring that their employees are adequately trained for the jobs. It is true that many employers are still content not to provide any training themselves, but they still discharge a training obligation through the levy. Provided such employers took steps to secure elsewhere training and further education for their young trainees, we would not take a particularly pessemistic view of this, because it does not seem to us to be axiomatic that the best results can be obtained only if every employer in the land actively engages in training. The essential point is that a growing number of individual employers now realise, where they did not do so before, that all young people require adequate training, and are prepared to provide it themselves or secure it elsewhere if they cannot.

65. The duration of training is increasingly being associated with the time necessary to achieve a specified standard in skills, techniques or knowledge for the occupation concerned, rather than with some arbitrary period based on factors bearing little or no relationship to the training process. At the time of the 1961 White Paper, the concept of training was associated largely with that of apprenticeship, although most trainees were not "apprentices" in the formal sense. The duration of training and courses of further education was related to the length of apprenticeship, however irrelevant this might be to the actual time needed to train to the required standard. Already there have been changes in this respect, and an increasing number of the training programmes recommended by the boards are being related to the time needed to achieve a reasonable standard of competence in the occupation concerned. The Central Training Council in their statement "Time for a Change" of October 1968 outlined some powerful reasons why this practice should spread and indeed it is reasonable to anticipate that spread it will. Clearly as it does so it will have an impact on further education courses, including those for technicians.

66. The modular system of training has been introduced. Under this system the whole of a given field of training, other than the basic stage common to all entrants, is broken down into self-contained parts or "modules" covering particular skills, functions or areas of knowledge within the field. Training after the basic stage consists of modules, the number taken depending on the age and ability of the trainee, the period available for training, and the trained manpower needs of the employer and the industry generally. These factors may also determine whether the modules are covered concurrently, consecutively or intermittently. The close association, even integration, of education and training possible at the basic stage cannot be achieved to the same degree at later modular stages; on the other hand, it is not nearly so necessary at these stages. So far the system has been applied only to craft training in engineering, but it is spreading to other occupational areas and other levels, and it seems possible that its application to some aspects of technician training will follow. The organisational and other problems which it presents for the further education service are being tackled energetically and effectively in the craft field, and we are confident that the service will rise to whatever challenge it may present in the technician

field. The indications are that it is possible to devise educationally sound and acceptable courses suitable to be associated with a modular system of training.

67. Training is now increasingly being seen as a continuous process which may extend through a large part of the person's working life. This is in marked contrast to the system where entry to training was tied to a particular age, where training ended when the due period of "apprenticeship" had been completed, irrespective of whether the trainee had achieved any formal qualification, and where as a general rule no further training or re-training was envisaged. While a person's initial training and associated education may require a somewhat shorter period than was thought necessary in the past, it is essential to make provision for mature people who have to adapt themselves to changing circumstances of employment and to changing individual jobs. This concept of training as a continuous process is applicable to all categories of employment, but nowhere is it perhaps more applicable than at technician level. The further education service must be ready to provide courses to help meet this need.

Changes in the Pattern of Employment and the Nature of Industry

68. Since 1961 there have been changes in the nature of industry and commerce, and the resulting pattern of employment, which have altered the requirements of existing technician jobs and created many new ones. These have been brought about by technical developments, by organisational changes, and by improved management techniques. Technical developments in production industries have caused products to become more complex and involve new applications of science and technology. The same is true of industrial plant and the process industries. All this creates greater demand for production and maintenance technicians, and in some cases widens the field in which they have to operate. Increasing attention at the design stage to maintenance techniques for complex and expensive equipment and the development of systematic fault-finding schedules may, on the other hand, have the effect of enabling lower level technicians to undertake first-line maintenance. This process can in turn, however, demand more and better qualified technicians in development and design, and also to take charge of maintenance teams.

69. The increased scope, performance and complexity of new products and plants also throw up considerable problems of technical and administrative liaison at design, assembly and construction stages, and the number of new technician jobs in these areas is fast increasing. The increasing pace of development of some highly sophisticated automation control systems demands more technicians, while the techniques applied in some automatic systems (e.g. numerical control) change the nature of the operation and the job of the technician.

70. Of recent years, too, industry has become more conscious of the need to use the skill and ability of people in the most efficient way. Techniques of job analysis have been developed and the scope of many jobs reorganised to relate them closely to the ability and knowledge to be expected of the kind of person who does them. This has resulted in an increasing recognition and understanding of the role of the technician, and an awareness that in some cases there is a shortage of technicians in a logical job structure.

71. Marked advances are taking place in developing a more scientific approach to the solution of administrative and management problems through techniques

like operational research, value analysis, quality control and so on, and in the use of computers for data processing and retrieval. A growing number of jobs in this kind of work are particularly appropriate for technicians.

72. Some of the most marked changes in the nature of jobs have taken place in the area of clerical and administrative work brought about by the application of data processing systems, office machinery and in particular, computers. The pace of such change may well accelerate rather than diminish in the foreseeable future. While there are no signs yet that fewer people will be needed in offices as a result, it is likely that the kind of operations they perform will be radically different from what has gone before, and that a great many will be technicians within our definition.

73. These are just a few of the developments which are taking place, but they are enough to illustrate the widespread and rapid changes which they entail in the type of work force needed. They affect in particular the technician category, and point to the need for a system of technician training and education which, if it is properly to serve the nation, must be almost infinitely flexible and immediately responsive to new expressions of need.

Changes in Professional Requirements

74. As we mentioned in Chapter II, the 1961 White Paper referred to the two distinct purposes served by the national certificate and diploma courses, those of providing qualifications in their own right for different grades of technicians, and of providing a route to professional qualifications. This is still valid for a wide range of national certificate courses, but much less so than hitherto in the important field of engineering. In 1965 the constituent institutions of the Council of Engineering Institutions (CEI) decided—it was in fact a condition for the grant of a Charter to the Council—to relate their educational requirement for corporate membership to a degree of a university or the Council for National Academic Awards (CNAA). The effect of this was that (i) the ONC and OND would continue to provide a route into degree courses, and through this to professional qualifications; (ii) the HND would still attract some measure of exemption from final professional examination requirements; (iii) the HNC in the various branches of engineering would no longer attract the exemptions it formerly did from the final examination requirements of the leading professional institutions in engineering. In effect the HNC in Engineering for the majority of students now serves but a single purpose, that of a high-level technician qualification in its own right. For a minority it may still assist towards the attainment of a professional qualification, since a pass in an appropriate HNC and three supplementary subjects qualifies the holder to enter a course of study leading to Part II of the CEI final examination.

75. Even before 1965, however, the importance of the HNC in Engineering as a route to full professional qualifications had been diminishing as new, more efficient and less arduous opportunities of qualifying through university and CNAA degree courses became available on a wide scale. The HNC route had, in effect, become unnecessary for any save the minority who, for one reason or another, had been unable to branch off into a degree course at an earlier stage. Indeed, independent of the CEI decision, the stage had been reached where many were convinced that the HNC courses should no longer be designed to reflect the needs of a diminishing minority who used them as a

route to professional qualifications, but should be re-planned to suit the educational needs of the higher grade technician majority whose industrial functions and responsibilities were rapidly increasing in importance. Those who took this view saw in the CEI decision a convenient opportunity of re-designing the courses as courses specifically for higher grade technicians, and in fact this has already been done.

76. This development in engineering has not been emulated in other fields, where national certificates continue to earn professional exemption much as they have done in the past. But the rising educational standards being imposed by more and more professional bodies on those seeking entry to corporate membership, and the ever-widening opportunities for forms of higher education other than the part-time method, make it possible that similar developments will take place in future in fields other than engineering. This must call into question the extent to which the requirements of professional bodies should influence the content and other aspects of the courses, and the role of professional bodies in the system of syllabus-building, examination and administration of national technician courses.

Changes in the Pattern of Educational Provision

77. Since 1961, the secondary schools have seen extensive developments in a number of major aspects. There have been marked changes, some already with us and others in prospect, in the curriculum as new types of courses are developed under the influence of the Schools Council since it was set up in 1964. The Newsom Report of 1963* has, among other things, pressed the need for a more vocationally-biased approach to the education of boys and girls in the later years of compulsory education. A new type of nationally accredited examination, developed on a regional basis and controlled by local education authorities and teachers, has emerged in the Certificate of Secondary Education. This is taken at the end of a five-year secondary course, and follows the single subject pattern set by the General Certificate of Education.

78. There have been significant changes in the make-up of the body of secondary school pupils itself. The proportion of both boys and girls staying on voluntarily beyond the statutory school leaving age has risen every year, and has given rise to larger fifth and sixth forms and greatly increased numbers of school leavers with academic qualifications suitable for direct entry to many technician courses.

79. Changes in the organisation of secondary schools, and the extensive moves towards the comprehensive system, have meant the development of larger schools allowing for wider curricula and more individual choice of courses. These changes have also brought about the development of different types of secondary school catering for the older pupil, for example sixth form colleges, and have started moves towards co-ordination between schools sixth forms and colleges of further education in the general area of provision of full-time education for the 16-19 age group. In one or two cases there have been joint ventures between schools and colleges to provide full-time OND courses for young people in the age group who are still formally school pupils.

80. One considerable change yet to come is the raising of the school leaving age from 15 to 16 in 1972/3. There is also the associated proposal (which would

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* "Half our Future"; a report of the Central Advisory Council for Education (England) (HMSO)

require legislation to give effect to it) by which the final year of compulsory education might in suitable cases be taken at a college of further education instead of a school when the leaving age goes up to 16. These developments are bound to have a profound effect on the G and other pre-technician types of course, and on the quality and quantity of school leavers who may be expected to seek technician and comparable employment.

81. Equally important developments have taken place since 1961 in higher education. The recommendations of the Robbins Report* have led to a great increase in the opportunities open to young people to follow courses leading to degrees of universities or of the CNAA. Requirements for entry to degree courses, especially those leading to CNAA degrees, have been altered in such a way as to permit entry to such courses of the best of the young people who leave school at 16 or so to take national certificate or diploma courses. The CNAA, too, has powers under its Charter to award ordinary as well as honours degrees, and certificates and diplomas as well as degrees; and it may do so in respect of part-time as well as full-time courses. This clearly has implications for technician education, although it is not so far possible to spell these out.

82. The former colleges of advanced technology, which with one exception were within the system of colleges maintained by local education authorities in 1961, have now become universities, and the next year or so will see the designation of thirty or so polytechnics which, while concentrating on the provision of advanced further education courses, will not be limited to degree work. In fact, a significant proportion of their work is likely to be concerned with the education of higher grade technicians of all kinds.

83. The Open University will begin to function in 1971. It is not yet clear whether and to what extent this development will affect provision for technician education. As, however, the work of the Open University, especially on the science and technology side, is likely to lead to the development of links with polytechnics and other colleges of further education, it is not unreasonable to suppose that it will have some effect, even indirectly, and those responsible for technician courses must be ready to identify this situation where it occurs and react to it.

84. The foregoing is necessarily a very brief review of the main developments in education since the White Paper, but we think it is sufficient to show that they amount to a good deal more than minor changes in parts of the system. In fact, taken as a whole, they amount to something of a transformation of the education scene. The effect of this will be felt in the field of technician education perhaps more than in others, since the impact of the changes occurs not only at the lower and upper ends of the range of provision but, with the development of full-time school/college technician "link courses" for the 16-19 age group, in the middle as well. The student "raw material" likely to be coming forward from the schools for technician courses in future seems to us to differ so much from that which was to be anticipated on the basis of things as they were in 1961 that this factor alone would have constituted a good and sufficient reason for looking again at the existing structure of technician courses and examinations, even if the other important developments to which we have referred in this chapter had not taken place as well.

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*"Higher Education"; Report of a Committee on Higher Education appointed by the Prime Minister, 1963 (Cmnd 2154) (HMSO)

Chapter V — EXPERIENCE OF THE EXISTING PATTERN

85. The very large number of written submissions of evidence we received bore a striking testimony to the extent of the current interest in the training of technicians and their non-technical counterparts. Much of it was concerned with individual courses, although when inviting evidence we tried to make it clear that we were unable to concern ourselves with details of this nature. However, even evidence of this kind proved of value to us in our general assessment of how effective or otherwise the present pattern of courses appeared to its users.

86. In general, we found that the attitude of those submitting evidence was much conditioned by their degree of familiarity or current involvement with the technician concept. Thus, bodies connected with engineering and associated industries tended to be in the van of those who, while not especially critical of the present pattern, were nevertheless beginning to discern an emerging need for changes in its structure, not only to match the training recommendations of the Engineering ITB, but also to meet the changing employment patterns in industry, and to satisfy the growing desire of technicians themselves for a progressive structure of educational courses designed specifically for them.

87. Bodies outside engineering, in particular those in some science-based industries and in construction, where higher technician courses are still a recognised route to professional qualifications, tended to take a rather different view. They thought on the whole that, subject to comparatively minor modifications, the existing pattern was quite adequate at national certificate and diploma level, while the G and T courses seemed to be developing satisfactorily and should be allowed to continue to do so.

88. As we have already indicated, the business sector had some difficulty with the technician concept as such, but in general those who sent us evidence pertaining to this sector were well able to recognise the range of comparable occupations in which we were interested, and advise us of their views of the educational provision which exists for them. However, the whole background, both of concept and of course provision, differs so much between the technical and the business sectors that we consider it not only convenient but logical to report separately on evidence concerning them.

The Technical Sector

89. The general trend of the evidence here was to the effect that the main features of the existing pattern are broadly satisfactory, and that while experience has shown that modification and simplification are required, the pattern is substantially capable of meeting the present needs of students and industry.

90. There was in the evidence much discussion of the "two routes" pattern of the White Paper, that is to say the T course route on the one hand, and the national certificate and diploma course route on the other. The T course was widely recognised as providing a broad technical education based on the practical approach to technician problems; the national certificate course as providing a better educational medium for the technician with an aptitude for a more academic approach to his subject. Many argued that this dual system should be maintained; that experience had shown that some students are suited to one route and some to the other, and that they should continue to have the

choice; that the system also offered students alternatives at different points of entry and enabled those who were capable of doing so to continue their education to the highest level and achieve in many cases degrees or corporate membership of a professional body or both; and that it offered industry a wide variety of courses different not only in subject and level but also in approach. In fact, ran this school of thought, these two main routes formed the basis of a flexible and comprehensive system which, given a number of modifications, especially in "bridging" arrangements between the different routes and courses, could be operated to meet any reasonable need that might conceivably be expressed by either industry or students.

91. There was, however, a body of opinion which took the view that while the White Paper pattern was producing generally satisfactory results, it could be made more effective by combining the separate T and national certificate routes, especially at the lower level. It was pointed out that many technician students never went beyond the T (Part I) or ONC stage of their courses, and that in practice they tended thereafter to be employed on the same or similar jobs in industry despite their rather different educational backgrounds. This was because these different backgrounds were not matched by different industrial requirements at their level. Even the products of T (Part II/Final) and HNC levels tended to occupy similar jobs in industry. This interchangeability in the actual work situation tended to call in question the need for two distinct and separate forms of educational preparation.

92. A good deal of the evidence submitted to us was of the mutually cancelling variety. This is perhaps natural, as the views from most sources tended to be based on experience and observation of a particular course or group of courses, and clearly some have been more effective and successful than others. For example, some took the view that G courses were fulfilling their diagnostic role admirably; others that they had signally failed to do so. In the passages which follow, and which relate to the various kinds and levels of courses as well as to more general aspects affecting all courses, we have tried to set down issues emerging from the evidence on which there appeared to be some consensus of view, and which have had a bearing on our own consideration of these matters, and our consequent recommendations.

The G Course

93. The purpose of the G course is essentially prognostic as between the T course route and the ONC route. There is some evidence that, once on an ONC course, the former G student does as well in examinations as his fellow who entered with "O" levels, although his drop-out rate from the course tends to be higher. But the function and therefore the content of the G course tend to pose a dilemma. Because it is a pre-ONC course, it must try to ensure that its more academically-inclined students reach a sufficiently high standard in mathematics and science to prepare them for entry to the ONC, and in general the syllabuses are designed to this end. However, it is also a pre-T course, and one inevitable result of gearing the standard of mathematics and science to ONC entry level is that much of the syllabus is unsuitable for the more practically-inclined student who will go on to the T course.

94. Our attention was also drawn by more than one source of evidence to a practice which is apparently fairly common in colleges, that of providing a

combined G/T. 1 year because it is not possible for one reason or another to provide both courses separately. This is condemned, rightly in our view, as unfair to both groups of students. It must certainly vitiate the usefulness of the G course as a diagnostic course, and pose in acute form the dilemma we referred to in the preceding paragraph.

95. There was a considerable weight of opinion—although it was not unanimous—that the colleges should play a more direct and continuous role in the diagnostic process which lies at the heart of the G course. There was a suggestion that better results could be achieved by introducing a mandatory external examination at G.1 stage to decide whether the student's next stage should be craft, T.1 or G.2. The general view, however, was against more formal examinations, and for greater teacher involvement in the assessment of students and their selection as between T and ONC courses. It was felt quite firmly that the student's progression beyond G.1 should be a matter for his teachers to decide, and that their view should also prevail in any case where the external examination at the end of a G course did not indicate a clear-cut prognosis one way or the other.

96. On the whole, the evidence tended to favour the continuation of some form of diagnostic process in further education at pre-technician level, certainly as long as the two routes pattern survives, and this even when the school leaving age goes up to 16. It was agreed by all that there will then be no need for anything longer than a one-year course, and indeed there was a feeling that in many cases even a year would be too long a period to keep a young person of 16 waiting while his potential for one or other of the existing technician courses was assessed.

End-On T Courses

97. Experience with end-on T courses appears to vary from one industry to another. Some are clearly successful and fulfil a real need, especially in industries where craft-based experience is regarded as particularly valuable for certain kinds of technician. There are difficulties, however, in devising and operating suitable technician-level courses with adequate mathematics and science on the basis of what the students have previously done in a craft course, and it was put to us that it is not in the interest of an industry or the young entrants to it that the end-on approach should be the only one available to its trainee technicians.

98. We were told that the increasingly technical nature of industrial operations in general, taken with the identification of more technician occupations and the development of suitable training programmes by the training boards, would result in changes in the recruiting pattern of industry where at present recruitment to technician grades is mainly by selection from the ranks of craftsmen and operatives. These changes, it was stated, should in turn result in more young people being recruited directly from school as technician trainees, and going straight into technician courses. Even so, it was felt that in most industries a significant number of those initially trained as craftsmen would continue to be selected for technician posts, and would need an opportunity of taking a course which had regard to their previous education, training and experience.

Ab Initio T Courses

99. The burden of evidence relating to ab initio T courses was that the pattern

evolved since 1961 provided a sound structure that satisfied the needs of both industry and the individual student. Entry level, content and standard were regarded as being about right, and it seems clear that these courses have on the whole achieved a high degree of acceptance where they have been introduced.

100. Indeed, their popularity has led to criticism that the range of provision is now so varied and complex that it creates problems for those who have to select courses for individual students, and even more so for the colleges who are expected to provide the courses. It was pointed out that each existing T course has been devised to meet a specific and identified need, and that this approach to meeting the needs of industry could, if continued, give rise to a bewildering array of courses and formidable problems of provision. We are told, however, that some simplification has already been achieved by combining separate courses in the same broad areas of study, and that this process is being continued.

101. Another criticism of T courses was that once the student has embarked on one, he finds it a matter of some difficulty to transfer later to the national certificate route if it is found that this would be more appropriate for him. This criticism was, however, held to apply as much to the ONC at one end of the "bridge" as it does to the T course at the other end. The difficulty lies in the fact that the two courses are different in kind, so that there are inherent difficulties in transferring from one to the other. It seemed to be generally felt, however, that it would be wrong to alter the nature of each course so as to bring about a greater degree of resemblance between them merely in order to make it easier for a small minority of students to transfer between them.

102. The normal T course structure (Part I — two years; Part II — two years; Part III — one or two years) met with general approval. It is, of course, well known that this structure can be altered if this is necessary to meet the needs of technicians in industries where the training pattern calls for something different. There were a number of complaints, however, that the content of some courses, in particular the early stages of Part I, sacrificed education in the fundamental principles of the technician's work to that needed for the immediate requirements of his job, and that at this stage the courses should be less specialised and more broadly based. At the other end of the scale there were criticisms that the advanced stages of T courses failed sufficiently to prepare the higher technician for the supervisory and indeed junior management functions he is often required to undertake, and that attention needed to be given to this important aspect as well as to making him an expert practitioner in his technical field.

103. Despite these shortcomings, it is clear that industry regards T courses as the most valuable development in technician education in recent years. Indeed, it is their very success that has given rise to some of the criticisms which we received about them. This success is not to be measured solely in terms of meeting the needs of industry, important though that is; it is also to be viewed in the light of the regard in which T qualifications are held by students and by others concerned with the status of technicians. The new technician bodies coming into existence, and professional bodies introducing or considering a technician grade of membership, are in general prepared to accept advanced T qualifications on the same terms as HNCs for membership purposes. And, as we have previously mentioned, there is evidence that holders of these two qualifications are interchangeable in some job situations.

National Certificate and Diploma Courses

104. We have to confess that we experienced considerable difficulty in trying to assess the evidence relating to national certificate and diploma courses. It was commonly held that the certificate syllabuses tended to be overloaded, and that this inevitably led to superficial treatment of subjects and contributed to a wastage and failure rate which, although lower than in the pre-1961 period, is still far too high. On other aspects of national certificate and diploma courses as a whole, however, opinions tended to differ with the different subjects.

105. It seems clear from the evidence that much of the system of national certificate and diploma courses is being affected in no small measure by changes in professional requirements and by developments in other parts of the educational system, notably in expanded opportunies for other forms of higher education and the widespread introduction of T courses. The system, therefore, is coming to mean different things to different sectors of industry. For some, its main purpose is to provide the educational background for the technician force, although the development of T courses means that it is no longer alone in fulfilling that purpose. For others, its main purpose is essentially a means of preparing for professional status, with its function as a system of technician education as such largely a secondary, not to say fortuitous, one. There are many gradations of view within these two extremes

106. It has to be borne in mind, too, that engineering subjects comprise by far the largest segment of national certificate and diploma courses, and that in recent years this area of provision has been affected to a greater degree than any other by changes in professional requirements. Thus, the traditional role of the national certificate and diploma schemes, and the individual courses within them, has been called into question much more in engineering than in any other field.

107. In the circumstances, a summary of the evidence on this important sector of technician education can perhaps best be expressed in terms of the issues it posed. These seem to us to be broadly as follows:

(i) Can the ONC continue to fulfil a triple role as (a) a technician course in its own right; (b) a preparatory course for higher technician study; (c) a preparation for entry to a degree course? How far does the establishment of T courses call in question the first of these?

(ii) Are we not asking too much of the ONC student in expecting him to cover a crowded syllabus to what in effect approximates to university entrance standard in a relatively short part-time course? Do not the continued high wastage figures indicate that the standard expected is too high, certainly in relation to the technician education function of the course?

(iii) In the light of (ii), is there not a sound case for narrowing the functions of the ONC perhaps by transferring the degree/professional preparatory function to a revised kind of OND leaving the ONC to carry out only the function of educating technicians, including those who will go on to higher technician courses?

(iv) The OND does not seem to have realized its full potential. Is there any real justification for continuing it in its present form, or should it be retained with whatever modifications seem necessary, as a basic technician course with preparatory functions, perhaps in a form which would make it easier for schools and colleges of further education to present it jointly to make the best use of resources?

(v) The HNC at present fulfils a dual role, since it is recognised in some branches as a higher technician qualification in its own right, in others as a step towards corporate membership of professional bodies. Are both these functions proper to a single course at this advanced level?

(vi) How is the HNC affected by the development of advanced T courses, and the interchangeability in industry of persons holding either of these qualifications?

(vii) Is the HND necessary, given the availability of so many degree courses, and the power of the CNAA to approve college courses leading to ordinary degrees? Is it really a technician qualification at all in its present form, and is it relevant to the needs of industry?

The Non-Technical Sector

108. We have already described in Chapter III the developments which have taken place since 1960 or so in the pattern of technician-comparable courses for persons in the non-technical sectors of industry and commerce. In this part of our report we discuss the evidence we have had on the pattern, its advantages and shortcomings, and the extent to which it has met the needs of the employers and trainees for whom it was designed.

109. On the whole the evidence we had from the non-technical sector was more diffuse than that for the technical sector. This is partly due to the fact that a national pattern of technician-comparable courses has not been developed to anything like the same extent as technician courses, and partly to the difficulty of identifying technician equivalents in a clear-cut way. To our mind, however, it is also a reflection of the lack of support accorded by the business and commercial community to the courses that are provided. Our attention was drawn more than once to the unwillingness of employers to release their trainees for courses of further education, and indeed the numbers attending technician-comparable courses represent only a small fraction of the student-trainees in the fields from which they are drawn. At all levels of employment, the opportunities granted to employees on the commercial side of industry to follow courses of further education seem to be markedly inferior to those granted to employees on the technical side, while in commerce itself the position is as bad if not worse. We understand that the reasons for this are being explored by the Central Training Council. It was certainly represented to us as a major factor affecting the rate of development in this field of further education. It also helps to explain the large role played by correspondence courses in preparing candidates in the business sector for professional examinations. To be fair, however, we must acknowledge the big strides made by many commercial undertakings, and on the commercial side of manufacturing and other industrial concerns, in the development of systematic internal training schemes for their employees. In a number of cases these can be regarded as reasonable substitutes for or supplements to external courses for professional and other examinations.

Pre-National Certificate Stage

110. The substantial differences between the pattern of technician and pre-technician courses in the technical sector, and its non-technical counterpart,

derive mainly from the fact that the latter has no straightforward G, end-on or ab initio T course equivalents of a national character. As we mentioned in Chapter III, some broad similarities can be discerned between the purposes and functions of G courses and those leading to the Certificate in Office Studies. But the primary purpose of the COS is to stand as a qualification in its own right, and it is not considered by those who use it and those who provide it as fulfilling G functions in a satisfactory manner. There is a need, they argue, for something more at this lower end of the technician-comparable range of provision.

111. This need, it was felt, should be met by adding to the existing range of provision a specifically diagnostic one-year course which would lead either to the ONC or to the second year of the existing COS. It was also suggested that if provision of this kind were augmented by a national course of the end-on variety for those whose technician-comparable duties had to be based on proficiency in office skills (i.e. private secretaries, typing and office machine superintendents, and so on), the resulting pattern of national provision would more closely accord with the needs of students and employers, and would at the same time resemble the pattern of provision for technicians in the technical sector.

National Certificate and Diploma Courses

112. Evidence on experience of national certificate and diploma courses in this field tended to indicate that, while they are generally acceptable to the business community, they are regarded only to a limited extent as qualifications in their own right. Their main virtue, certainly at the ordinary level which accounts for some 80% of the total enrolments, is seen as providing a route to one of the professional-type qualifications which abound in the field of commerce. Thus, leaving aside the relatively few who go on to degree courses, the majority of successful ONC and OND students who proceed to the next stage of business education do so by way of a specialised professional course rather than by going on to the HNC or HND.

113. As long as the business world expresses its needs for trained people in terms of professional qualifications as distinct from general business qualifications, this process is bound to continue. The attraction of a professional qualification is extremely strong, and the signs are that the relative success of the ONC and D courses since their introduction in their present form in 1961 has been achieved largely because of the exemption they attract from the examination requirements of professional bodies. As we pointed out in Chapter III many of the leading professional institutions in commerce now offer exemption from their own intermediate requirements on a subject-for-subject basis to holders of certificates and diplomas with credits.

114. The OND in Business Studies, which did not exist before 1961, was said to be proving attractive to young people who wish to aim at university entrance or professional qualifications other than by the more conventional "A" level route, especially to some whose future professional interests are as yet uncertain. Certainly in terms of the numbers of students enrolled the course is showing itself to be one of the most successful ONDs ever established. There is, however, evidence (see the table of enrolments at Appendix No. 4) that its main attraction is for girls who leave school at 16 or so with four or more "O" levels,

and wish to enter a business career on the secretarial side with a qualification which denotes knowledge and potential for something a good deal higher than might be expected in, say, the ordinary run of shorthand-typist work.

115. It was suggested to us that this is a distortion of the purpose of the OND, and indeed that, starting from the proposition that the whole area of responsible secretarial work is at technician-comparable level, there should be a distinct course progression for those who have aspirations towards this kind of work. Under this, those already in employment and in possession of qualifications in office skills, would be able to undertake a part-time technician-type course, with a choice of subject appropriate to the nature of their secretarial duties and aspirations. Those leaving school to study full-time for the more advanced secretarial duties would take an OND in secretarial duties which would, by including shorthand and typing, English, commercial and secretarial subjects, and foreign languages, equip them to undertake the most responsible secretarial duties after a suitable period of practical experience in business.

116. There was evidence that in the business sector the two-year full-time HND is being used as a "fall-back" course by students with two or more "A" level passes who have failed to obtain entry to a university or CNAA degree course. Although many such students do well on the course, they subsequently have difficulty in getting suitable posts because (unlike their fellows who take the three-year sandwich HND) they have not had any practical business training, nor are they acceptable to employers as graduate trainees. Added to this, their HND attracts professional exemptions only to a very limited extent. There are fears that the number of such students, who are in effect taking the full-time HND for the wrong reasons, may grow unless there is further expansion in the opportunities open to them to take degree courses in business subjects, coupled perhaps with moves to restrict or abolish the full-time HND in this field.

Other Non-Technical Subjects

117. We had evidence concerning courses in the distribution and hotel and catering fields, which have until now been regarded as coming within the "commercial" sector of further education. Those who submitted evidence of this kind clearly had some difficulty in applying the technician concept to their experience and circumstances and they tended to identify their technician-comparable personnel by reference to the existing further education courses which they would expect middle grade employees to take. This position should, of course, alter as the ITBs begin to identify and analyse various categories of occupation for the purpose of drawing up training programmes. The Hotel and Catering ITB has already gone some way towards this, and, as a result of earlier work by the Hotel and Catering Institute and the Institutional Management Association, the existing national diploma scheme is being revised to produce qualifications at ordinary and higher level.

118. On the distribution side, we had evidence that the existing national pattern of technician-comparable courses was unsatisfactory. It was considered doubtful whether the National Retail Distribution Certificate course could be regarded as a technician-comparable course, and it was pointed out that there is in principle a gap of three years between its completion and the start of the course for the Certificate in Retail Management Principles.

This rather sparse provision of national courses for the vast distributive sector is matched by the apparent reluctance of the employers to use it. The numbers following the courses, relative to the potential number of students, are very small indeed, even allowing for special factors such as the high proportion of part-time and temporary staff employed, and the generally high labour turnover. It is evident that there is a massive task to be undertaken here, both in the provision of a suitable progression of courses for the people who "make things work" in distribution, and in the grant of full opportunity to attend them. We are given to understand that a review of courses is now under way, and that it is the intention to devise a comprehensive pattern of courses for all, from shop assistant to manager, working in distribution. We also understand that the Distributive ITB is collaborating in the review.

Experience with a bearing on all Technician Courses

Selection and Wastage

119. We think we should begin this passage of our report by differentiating between "wastage" and "failure". Many technicians are in jobs which require an educational background no higher than that represented by T (Part I) or ONC. If such technicians complete the course or part-course and obtain the appropriate qualification, and then for one reason or another call a halt to further education, it is no doubt a great pity in cases where the young people have it within them to go further, but it is not "wastage" as we are using the term. "Wastage" for our purposes occurs where a student embarks on a course, but drops out before completing it. Where a student completes the course but does not pass the examination at the end of it, he contributes towards the "failure" rate, but cannot legitimately be regarded as part of the "wastage" from the course.

120. Clearly it is of the utmost importance that initial selection for a course should as far as possible be right. In this connection there is some evidence that the G course is in general fulfilling its diagnostic function reasonably well. Table 1 supports this view to some extent. Also, in the field of engineering there are indications that ex-G course students' ONC examination results are on a par with those who came in with "O" levels (Table 6 overleaf). Thus it would appear that successful completion of the G course at the required standard is as good a base from which to proceed to an ONC course as the alternative 4 "O" level entry requirement. It was thought, however, that the reliability of the diagnosis revealed by the G course would be improved if there were less dependence on border-line results in what is a "once-for-all" examination, and more on the teacher's personal assessment of a student's suitability either for T or ONC. There was general agreement that, once on his course, the student should be encouraged to continue with it until he has gained a recognised qualification before he attempts to transfer to another course which is likely to make greater demands on him.

121. The White Paper proposals seem to have gone some way towards remedying the problem of failure at the ONC stage. Pass rates in some—but not all—subject examinations are climbing, although slowly and rather erratically in a number of cases. The most marked advance has taken place in the field of engineering. While a straightforward comparison between the pre-1961 and the

Table 6

ONC IN ENGINEERING PERFORMANCE OF STUDENTS WITH VARIOUS PRE-ENTRY QUALIFICATIONS, 1965 TO 1967

This Table gives the numbers and percentage of successful and referred candidates for the ONC in Engineering in the years 1965 to 1967 who entered the course from G2 compared with the performance of those who entered with GCE 'O' level and other qualifications.

Qualifications for entry into course	1965					1966					1967				
	Number of candidates	Passed		Referred		Number of candidates	Passed		Referred		Number of candidates	Passed		Referred	
		Number	%	Number	%		Number	%	Number	%		Number	%	Number	%
4 GCE 'O' levels	5,323	3,193	60	161	3	6,274	4,313	69	166	3	6,969	4,583	66	139	2
G2 success with two credits	3,660	2,562	70	74	2	5,815	3,784	65	205	4	6,018	3,672	61	196	3
*Other qualifications	4,324	2,032	47	87	2	3,213	1,697	53	88	3	2,851	1,544	54	114	4
Totals	13,307	7,787	58	322	2	15,302	9,794	64	459	3	15,838	9,799	62	449	3

**Note:* "Other qualifications" include alternative qualifications acceptable to the Joint Committee e.g. certain overseas qualifications and a wide variety of UK qualifications, in addition to special case entrants and referred candidates from the previous year.

present positions is not possible because of the replacement of separate ONCs for Mechanical and Electrical Engineering by the ONC in Engineering, it is clear that the pass rate has advanced significantly over the relevant period. Table 7 (overleaf) indicates this and other pass rates.

122. The wastage and failure rate on the OND course, and on courses at the higher levels, do not present anything like the same problems. On the whole, pass rates are reasonably satisfactory for the OND and HNC, and as a general rule they are even better for the HND, as will be seen from Table 7. (overleaf) The diploma courses are full-time or sandwich, and this fact itself suggests a motivation and creates an attitude and opportunity for study conducive to low wastage and high success rate. While the HNC is part-time, it comes at a stage in the educational progression where not only are motivation and determination to succeed high, but the body of students has in general undergone a "selection by doing" process which of its nature allows to remain only those with a reasonable chance of completing the course successfully.

123. Most of the suggestions made for countering wastage and raising pass rates concerned either more time for study, or changes in the frequency and type of examinations or the creation of more opportunities to transfer for students who find themselves on what they and their teachers consider to be the wrong course. We deal with evidence of this nature under the appropriate headings below, but we would like to refer here to evidence we received on the subject of the transition from school to college, which in our view is closely bound up with good initial selection and, through this, with wastage and failure rates.

124. Our evidence suggested that liaison between schools, colleges and industry was not nearly as effective as it might be; that many leaving school from the fifth and sixth forms were ill-informed about the various forms of technician education immediately open to them and the possibilities that lay beyond; that secondary schools are not fully aware of the alternatives to CSE and GCE "O" and "A" levels offered to suitable pupils by T and national certificate and diploma courses; that there is in fact still a general lack of knowledge of the further education system on the part of headmasters and teachers, careers advisers, parents and employers, despite the massive public relations efforts made during recent years by the education departments, local education authorities and the youth employment service. The associated point was made that an increasing number of pupils will remain at school but will fail to achieve the standard of entry to university or comparable courses; that many of these will be potential technicians, although probably unaware of their opportunities in this direction; and that steps should be taken to get information on technician opportunities and courses to them.

Time for Study

125. There seemed to be general agreement that the overall duration of technician courses (i.e. three or four years to Technician level, two years to ONC/D level, two further years to HNC/D level) is about right as it stands. There was also general agreement, however, that so far as the part-time courses are concerned, more time is needed in each year to cover the syllabus adequately. The normal allocation of 240 hours for technical subjects is regarded by many, in

Table 7

Percentage Pass Rates in ONC, OND, HNC and HND from 1960 to 1968

Subject	ONC									HNC									OND									HND								
	1960	1961	1962	1963	1964	1965	1966	1967	1968	1960	1961	1962	1963	1964	1965	1966	1967	1968	1960	1961	1962	1963	1964	1965	1966	1967	1968	1960	1961	1962	1963	1964	1965	1966	1967	1968
Building	62·3	64·1	63·3	60·8	63·1	59·1	64·4	61·8	62·1	79·2	80·8	73·5	76·7	81·8	75·2	76·0	78·5	85·0	68·8	64·7	65·7	67·2	64·8	67·8	63·5	73·2	73·1	81·7	79·0	79·8	84·7	88·4	88·8	79·1	74·8	89·4
Mechanical Eng.	43·8	46·1	47·6	47·4	49·2	50·0	—	—	—	63·6	64·2	63·5	64·7	60·6	60·2	60·5	64·0	66·0	57·5	59·6	66·4	57·8	59·9	58·6	—	—	—	86·5	83·7	81·3	86·8	87·6	86·9	82·7	81·4	83·2
Electrical Eng.	52·1	52·4	52·5	55·2	55·6	51·6	—	—	—	66·9	66·8	62·1	65·9	62·9	58·2	61·8	62·6	57·6	79·4	53·5	75·7	61·3	82·6	—	—	—	—	94·8	82·1	87·4	75·2	76·4	75·4	82·7	80·0	79·6
Engineering	—	—	—	—	—	58·2	64·0	61·9	61·4	—	—	—	—	—	—	—	—	86·2	—	—	80·6	68·6	72·3	71·4	72·7	68·5	71·5	—	—	—	—	—	—	—	—	—
Production Eng.	—	—	—	—	—	—	—	—	—	86·4	83·9	79·3	79·9	78·5	78·0	76·3	79·2	81·7	—	—	—	—	—	—	—	—	—	72·7	88·9	83·8	94·1	84·2	94·9	95·0	93·0	92·8
Aeronautical Eng.	—	—	—	—	—	—	—	—	—	78·6	50·0	59·2	45·5	78·8	48·3	75·0	54·2	71·0	—	—	—	—	—	—	—	—	—	—	100·0	57·1	100·0	100·0	87·5	84·6	100·0	100·0
Civil Eng.	—	—	—	—	—	—	—	—	—	62·7	59·1	71·8	70·5	74·8	75·0	78·4	72·2	77·7	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Chem. Eng.	—	—	—	—	—	—	—	—	—	72·3	72·9	71·2	64·0	76·3	64·9	71·6	69·8	59·6	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	67·0	74·0
Chemistry (+ Applied)	49·3	50·7	50·8	48·6	51·3	53·8	54·9	62·7	73·0	61·3	59·4	63·1	57·5	53·9	60·1	57·8	62·5	67·4	—	—	—	—	—	—	—	—	—	66·6	92·8	82·8	55·3	71·4	71·9	77·3	73·5	69·9
Physics Applied	63·9	70·2	66·3	64·2	67·2	64·3	72·5	66·3	—	67·7	72·5	64·4	66·3	67·4	70·2	74·6	71·8	70·7	—	—	—	—	—	—	—	—	—	—	—	—	—	92·8	85·7	97·5	96·9	96·4
Biology Applied	—	—	—	—	—	—	—	—	—	—	—	—	—	81·8	76·1	77·6	73·0	76·4	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	60·0	66·8
Sciences	—	—	—	—	—	—	—	61·3	62·9	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	74·0	74·8	—	—	—	—	—	—	—	—	—
Metallurgy	49·5	50·1	55·9	55·7	54·5	54·0	56·8	62·9	—	76·8	76·7	82·2	78·6	81·2	80·6	78·6	74·1	80·2	—	—	—	—	—	—	—	—	—	—	—	90·9	94·0	94·4	90·9	84·7	81·2	85·5
Foundry Techy	—	—	—	—	—	—	—	—	—	—	—	—	—	92·3	92·3	83·3	96·4	75·7	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	100·0
Mining, etc.	59·1	56·1	56·1	59·2	56·6	56·6	57·2	64·6	66·7	66·7	71·0	75·2	76·5	74·4	71·4	68·8	72·3	65·9	—	—	—	—	—	—	—	—	—	92·7	90·4	89·1	89·6	82·1	89·7	86·0	80·6	85·4
Textiles	57·5	60·2	74·6	71·4	90·5	71·4	60·3	43·1	47·1	68·6	92·0	92·0	91·5	93·4	88·8	85·5	96·2	87·1	—	—	—	—	—	—	51·1	65·2	52·1	—	—	—	—	—	—	—	—	100·0
Naval Architecture	37·1	47·1	50·6	48·7	44·3	45·5	44·2	55·1	71·2	79·3	86·3	77·6	63·3	71·2	74·7	77·8	80·5	70·4	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	100·0	100·0
Nautical Science	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	62·7	71·1	—	—	—	—	—	—	—	—	—
Business Studies	—	—	48·6	45·2	50·4	49·4	49·6	53·6	55·6	—	—	94·6	82·8	80·9	77·4	75·6	73·5	77·3	—	—	—	68.0	69·0	70·8	66·0	68·1	71·2	—	—	100·0	73·7	84·4	77·4	82·8	79·3	78.3

industry and commerce as well as in educational circles, as imposing severe limitations on syllabus content and teaching method.

126. The reasons adduced in support of the plea for a more generous time allocation for technical subjects can be summarised by saying that it is needed:

(i) to broaden the base of the technical studies;

(ii) to permit more effective learning, through additional laboratory and practical work, more project work and the use of tutorials; and to contribute towards a general reduction in the atmosphere of "pressure" which appears to be endemic in part-time technician courses, especially among slower students;

(iii) to provide a better opportunity for instilling in the technician the importance of managerial, administrative, communication and commercial operations which contribute as much to the efficiency of a company as his own technical operation;

(iv) to afford an opportunity for adding specialist modules to a basic course to meet particular needs of firms and students;

(v) in combination with the time allocated to general studies, to assist in promoting the personal development of the technician, to improve his powers of expression, and in general to provide him with a sound foundation of technical education during his early years to equip him to meet technical change, to which his work is especially sensitive.

127. There was some divergence of view on the extent to which additional time was needed, and on how it might be provided. It was suggested by some, for example, that the time for study on technician courses should be increased to 450 to 500 hours a year, based roughly on double day release. Another view —and we found this suggestion somewhat more logical—was that the number of hours required should be based on a suitable syllabus agreed by the educational and industrial interests concerned; that release for the required number of hours should then be arranged in the way that best suited the needs of the industry, the college and the students; and that the form of the release might vary from one industry or one locality to another.

128. There was a good deal of agreement, in both industry and education, that the block release and sandwich forms of study are to be preferred for technician courses. Industry would wish to see a longer college year so that firms could make the most effective use of training places under a block release or sandwich system. It was pointed out by some in industry that more time for study would be available through the normal day release pattern if the colleges were open for a longer period each year.

129. In a number of industries and across most of commerce the day release course was preferred to block release, the following points being made in its support:

(i) many young people preferred day release rather than block release, even where the latter did not entail living away from home;

(ii) slower or older students found it easier to maintain continuity of study on a day release basis;

(iii) manpower considerations made day release the only feasible form of release for the smaller employer.

130. It was generally accepted that evening classes are not suitable for technician and comparable courses leading to qualifications of a national character.

Examination Techniques and Procedures

131. All technician courses include within the arrangements for their conduct some form of assessment of the individual student's ability and progress by means of examinations. We did not find any quarrel with the principle that the student must, at certain stages, be tested by reference to some objective criteria, but there was a good deal of criticism about the frequency of examinations and some of the methods used. The traditional method of external examination attracted much criticism on the grounds that it was a confining influence on the teaching and was liable in any event to give a false picture of the student and his real achievement, and often did. There was little support for the practice of using external examinations to make interim assessment of a student's progress; indeed, there were a number of outright calls for the complete abolition of this practice on the grounds that it needlessly compounded the faults inherent in the traditional external system by increasing the frequency of its application. It was also suggested that rules and regulations governing external examinations should be made more flexible, for example that facilities for referment should be improved and that borderline candidates should be treated more liberally. Some students thought that the method of achieving qualifications by accumulating passes in individual subjects was to be preferred to the grouped course examination method.

132. Many suggestions were made about different kinds of examination techniques that might be adopted in connection with the examination of technicians. In general, there was a strong trend of opinion towards greater participation by the students' teachers. Most of the following examination components suggested in the evidence give the opportunity for such participation, although the first and most commonly used does not do so:

(i) a written paper externally set and marked;

(ii) a written paper set and marked internally;

(iii) a written paper set and marked internally, with external assessment;

(iv) an objective test, externally set and marked;

(v) practical or oral examination, or both, dealt with externally or internally with external assessment;

(vi) course work assessment by the student's teacher; and

(vii) project work, internally or externally assessed.

The general view was that technician examinations should include some or all of these components, as appropriate to the case, but that in all cases more weight should be given than at present to assessment by the teacher. In fact, there was a body of opinion that the teacher's assessment should constitute the most important single component in the system of student testing, with other components, externally set or moderated, used as an independent check on the validity of the assessment. This, it was thought, would give the most reliable view of the student's performance and ability.

133. Many thought that the real purpose of examinations should be more firmly borne in mind. Facility at passing external examinations, it was argued, did not necessarily mean that the technicians concerned did a better job in industry. Technicians should be able to extract information from different sources, analyse it and determine the action to be taken, and adjust the action on the basis of its practical effect. The traditional external examination was an unsatisfactory way of testing ability of this kind. What should ultimately be aimed at was an end-of-course "profile" of a student by reference to which both his academic and industrial ability could be gauged.

134. As we said at the start of this section of our report, there was no quarrel with the principle, dear to employers in industry and commerce, that the verdict on a student should have regard to objective criteria, and it was suggested that to this end there should be close co-operation between teachers, employers and examining bodies. It was put to us that there is a unity of purpose covering the preparation of courses and the subsequent testing of students; that this unity of purpose should be prominent in the minds of those responsible for setting out what is to be taught and those who check what has been learned; and that it should result in a close and continuous relationship between those prescribing curriculum and syllabuses and those who test the results.

Transfer Between Courses

135. If there was any one area in which the expressions of views submitted to us achieved unanimity, it was that there should be flexible arrangements to enable technician students to transfer to courses more suited to their aptitudes and abilities whenever it was found that their initial courses were too difficult for them, or that they were capable of more exacting studies.

136. It is self-evident that further development of the system of "two-way bridges" between different types of courses is desirable in principle. It would provide more chances of getting square pegs into square holes, and reduce the risk of wastage and examination failure inherent in a situation where some students find themselves attempting something beyond their ability, while others are working below their true potential. But our evidence recognised that in a number of respects the bridging proposition poses problems of application, and one or two notes of caution were sounded. First, as we have already noted in paragraph 101 in relation to transfers between T and ONC courses, there is a danger that preoccupation with bridge-building to allow the passage of a minority from one route to another will result in some distortion of the main routes themselves. Again, the stage of a course at which bridging is to be permitted needs careful consideration if the student is not to risk ending up without any qualification at all. Subject to these cautions, however, there is a desire on all sides to see suitable and clearly understood arrangements made to permit technician students to change the direction of their further education when it becomes clear to them, their employers and their teachers that such a change is desirable.

137. Our evidence was that transfers are not so easily achieved as they might be, and that where they do take place, the students concerned are apt to find themselves behind their fellows in regard to the normal age pattern for the new

course. It was suggested that additional bridging studies in theoretical knowledge for T students transferring to national certificate courses, and additional technology for those transferring in the reverse direction, would be especially valuable in avoiding serious delay of this kind.

Administrative Machinery

138. At present, T syllabuses are the responsibility of the CGLI (and to a lesser extent the six REBs who act collectively with CGLI in this and certain other matters through the Council of Technical Examining Bodies (CTEB)); and the NC and D syllabuses that of some two dozen joint committees, heavily representative of the professional bodies with an interest in the field of study concerned. Appendix No. 5 contains an account of the organisation and functions of CGLI, with details of the REBs and a brief note on the role of the CTEB. The organisation and functions of a joint committee are described in Appendix No. 6, which also gives a complete list of those operating at present. These examining bodies and joint committees may and do act independently of one another, and apart from that carried out in the CTEB, such liaison and co-ordination as exist in the different areas of the system are effected chiefly through H.M. Inspectors and the DES.

139. The CGLI and the REBs each have their own structure of executive and advisory bodies for devising technician syllabuses and conducting external examinations. For national certificates and diplomas, the respective joint committees (consisting of representatives of the education departments, the professional—and in some cases industrial—bodies concerned, and the teacher associations) devise the rules for their particular schemes. The professional institution most closely concerned normally provides the secretariat and deals with examinations work, while the DES processes applications from colleges and, through H.M. Inspector, checks on their suitability to run the courses. In general, national certificate and diploma examinations are internal college examinations externally assessed, although some colleges use the services of REBs in connection with examinations for the ONC and, in a few cases, the HNC. Difficulties arise where the professional bodies are unable to provide a secretariat for a joint committee, or have insufficient experience of examining to do so. In such cases the DES has to assume these functions and, as indicated in Appendix No. 6, it currently services a number of national certificate and diploma schemes, including such relatively large ones as Business Studies and Building.

140. The weight of evidence from industry and commerce on the existing administrative arrangements for technician courses and examinations constituted a plea for simplification and standardisation of the system. It was pointed out that while the basic pattern enunciated in the White Paper seemed simple enough, the actual provision of courses and examinations designed to give effect to it present a bewildering picture of complexity to employers and students, and indeed had reached the point where even those concerned with providing and administering the courses and examinations had some difficulty in following all its ramifications themselves. Much was made in evidence of the wide variety of subjects covered by courses and the number of levels of courses in each subject, each with a different requirement for entry (and sometimes with two or three alternative requirements at each level); the variety in nomenclature

of qualifications; and the multiplicity of professional and examining bodies involved.

141. Evidence from the education service claimed that the present provision arose from the varied and unco-ordinated demand made by the many bodies in industry, commerce and the professions which exercise control in one degree or another over the organisation and content of courses. Each such body appeared to assume that it could act independently, and set up examination committees with hardly more than token representation from those who were expected to provide and finance the new courses which the colleges were continually being asked to add to their range of provision. This approach to expressing the needs of industry and commerce, it was said, must inevitably result in a proliferation of courses, qualifications, committees, and so on; and with the setting up of ITBs and new bodies to represent technicians of various kinds, the position could only become worse unless steps were taken to co-ordinate the activities of all bodies who considered they were entitled to make decisions in the field of technician education and examinations.

142. The general trend of the evidence from all sides, therefore, supported the idea of rationalisation and simplification of the provision and co-ordination of the activities of all the bodies concerned with expressing needs for particular courses and qualifications and for devising the schemes to meet these needs. A suggestion we had from a number of different sources was that a new body (which for ease of reference we call a Technician Council) should be created to co-ordinate all aspects of technician education. Not all who made the suggestion were entirely clear as to the form and function of such a Council, but the general idea seemed to be that it should be representative of the examining bodies, teachers, professional and technician bodies, training boards and other appropriate industrial and commercial organisations; and that it should be responsible for co-ordinating demand for and supply of technician courses and examinations of a national character. Some went further and suggested that the Council should be responsible for evolving a system of national technician qualifications at a number of different levels, and on the basis of this perform certification, registration and other functions for technicians somewhat analagous to those carried out by the CEI for chartered engineers.

143. Not everyone was in favour of a Technician Council of this kind. A number of bodies thought that the existing arrangements for bringing technician courses and examinations into existence, and thereafter administering them, worked well on the whole, and that where co-ordination was really practicable it already existed, either through the CTEB for G and T courses, or through the DES for national certificates and diplomas. Evidence of this nature claimed that a new body such as a Technician Council, superimposed on what already existed, would merely further complicate an already complex situation, and might adversely affect the provision of technician education by reducing the existing flexibility of the structure and inhibiting the natural development of courses and qualifications to meet demonstrable needs.

144. Various other suggestions for improving the existing administrative machinery concerned the number, functions and composition of joint committees for national certificates and diplomas. There was a general feeling that there are too many of these, and that some means should be found of reducing

their number by amalgamation, or indeed by the creation of a single Council for National Certificates and Diplomas, with its own secretariat independent of the DES or of the professional bodies, with sub-committees responsible for different subjects. Formal liaison between such a body and the CTEB would, it was said, ensure co-ordination over the whole field of technician education, and result ultimately in a common structure of national certificate and T courses.

145. A number of those submitting evidence considered that the composition of joint committees needed some revision, especially in cases where the courses they administered were ceasing to be recognised as routes to professional qualification. Such committees, it was argued, should have far smaller professional representation, and stronger representation of teachers, training boards and, as appropriate, technician bodies themselves. In fact, the associations representing principals and teachers felt strongly that in any revision of the administrative machinery for technician courses and examinations, it should be borne in mind that greater weight than in the past needed to be given to the proper examination of educational considerations before new syllabuses and courses were devised, and that to this end teacher representation on joint or other examination committees should be strengthened.

146. On the framing of schemes for national certificate courses and examinations, evidence was divided between those who thought that all syllabuses and examinations should be devised and conducted centrally; those who were satisfied with the present system whereby colleges conduct their own internal examinations (or in appropriate cases take those of an REB) subject to national assessment; and those who thought that the system of college internal examinations, subject to assessment by external examiners (without any recourse to the services of an REB) best of all.

147. Those who favoured the national approach, based on a common syllabus and external examination and assessment, thought that only by these means could a truly national standard be achieved, and be seen by employers and students alike to be achieved. It would also, they said, avoid the large annual commitment of college resources, especially of teachers' time, to the preparation of internal examinations and the checking of results, and ease the transfer of students who, for one reason or another, had to change colleges during their courses. Those who favoured the college approach considered that national or regional syllabuses were too restrictive on teachers, who should have more control over what they taught and be much more closely involved in assessing and testing their students. In this connection there was criticism that some joint committees issued guide syllabuses which they thereafter expected colleges to adhere to in such a way that the so-called "guide" became virtually a mandatory national syllabus. There was also a plea that examination moderators should be appointed to colleges on a personal basis, and should be available for consultation with the college teaching staff during the course as well as during the period of examinations.

148. All in all, there seemed to us to be general recognition in the evidence that while simplification of the provision and rationalisation of the administrative structure are highly desirable, this is a proposition easier to state than to put into effect in view of the ever-growing number of bodies with a legitimate interest in courses and examinations, and that however streamlined the administrative

structure and the basic pattern of courses might become in time, the actual provision of the courses themselves would still present a picture of considerable complexity in view of the wide range of different needs which had to be met; and that no simplification or rationalisation would ever remove the need for teachers, training officers and employers to co-operate to the maximum in ensuring that each student was placed on the educational path most suited to his aptitudes, abilities and aspirations. We have borne this in mind in framing our own recommendations on future machinery.

PART 2 — CONCLUSIONS AND RECOMMENDATIONS

Chapter VI — SUITABILITY OF THE PRESENT PATTERN

149. It would perhaps be as well, before we begin to draw conclusions from the evidence submitted to us and make recommendations for modifications to the present structure, if we remind ourselves and those who may be called upon to take action on this report how a modern, flexible and well-conceived pattern of technician courses and examinations should be devised, and the purposes it should be expected to fulfil.

150. It should be based on courses designed to help produce educated and trained technicians capable not only of meeting an immediate need for skill and knowledge, but of adapting themselves readily to meet changes in these needs as they arise. The courses should recognise that the continuous development in the use of manpower in industry and commerce can quickly change the educational needs of particular technicians, and be capable of responding to such changes rapidly and effectively. The industrial and commercial bodies concerned with the training and associated further education should have full opportunity of collaborating with the educational interests in the work of devising new courses and keeping existing ones up to date.

151. The range of provision, although not necessarily the same for each sector of industry and commerce, should be sufficient to meet all reasonable demands and be capable of adaptation to satisfy national, regional or local requirements. It should have regard as relevant to the requirements of professional bodies so as to achieve maximum application of the exemption system. It should not, however, be allowed to become too complicated, and should lend itself to simplified administrative structures and assessment processes, and to the award of qualifications whose currency is readily understood and accepted by employers and students alike in all parts of the country.

152. The pattern should be effectively geared to the arrangements from time to time current for the period of transition of students from school to further education, irrespective of the form and, subject to minimum standards, level of the school education, and should ensure as far as possible that the student is placed in the right technician course to begin with. There should, however, be provision for vertical and horizontal transfer within the pattern of courses itself, and for transfer from and to other patterns (e.g. craft, technologist, professional), with special bridging studies where needed at particular transfer points, or when the student changes his technology or needs to be retrained. It should include arrangements for the different forms of study—full-time, sandwich, block release or day release—or for evening or correspondence courses where none of the others is suitable or available.

153. How does the existing pattern measure up to these needs? It is true that substantial changes have been made in the provision for technician courses since the White Paper of 1961, and that the range thus made available meets the present needs of some sectors of industry and commerce satisfactorily. It seems to us, however, that the resulting national pattern, viewed as a whole, is unsuitable in a number of important respects as an instrument for meeting not only existing needs, but also the new and changing needs likely to arise in the coming years.

154. In the technical sector, the existing pattern is developing more and more along the separate T and NC/D routes, each with its own system of courses and arrangements for administration. There is a tendency to meet every new expression of need by adding yet another course to the existing range of provision on one side or the other and, where necessary, creating yet another committee to be responsible for its administration. This proliferation makes the system ever more complex and difficult for students and employers to understand, tends to encourage students to specialise earlier than necessary, and almost certainly prevents educational resources from being used to the best advantage. The lack of overall co-ordinating machinery means that courses are provided in one part of the system without full regard to possible implications for cognate courses in the other part.

155. The nature of the present provision for technician courses and examinations, above all the nature of the administrative machinery, precludes the setting up for the whole technician field of arrangements, analogous to those already made in the craft field (see paragraphs 59-62), for the joint planning of further education and industrial training. Where a need for joint planning of new or revised technician courses arises, it has to be dealt with *ad hoc*, and in such circumstances it would be difficult to bring about root and branch changes even if these were clearly seen to be needed. This is a most unsatisfactory state of affairs even at this early stage of the work of the ITBs in the field of technician training. It is likely to become even more so if the present arrangements are still in force when the work of the boards in this field begins to gather momentum.

156. Then, too, it is clear from our evidence that different sectors of industry and commerce have different needs in the field of technician education and training, and are at different stages of development in their plans for meeting these needs. As we explained in our introductory chapter, the emergence of the technician, and of education and training programmes to meet his needs, is following something of an evolutionary process, with different branches of industry and commerce at different points along their evolutionary paths. The pace of development, however, is bound to quicken across the whole of industry and commerce in the years ahead. The setting up of the training boards; the changes in attitudes towards education and training; the changes in organisation and function within industry and commerce and the consequent development of new employment structures; the changes in the educational system itself, all point to a coming surge of activity in the field of technician and comparable education and training. We do not think that the present pattern of courses, examinations and qualifications, and above all the present administrative arrangements, will be adequate to deal effectively and economically with the demands likely to be made in the future.

157. The question of future arrangements for co-ordinating and administering technician courses and examinations was accorded high importance in most of the evidence we received. We ourselves have seen this question as the central issue of our remit. We are convinced that opportunities for encouraging the gradual emergence of a "modern, flexible and well-conceived pattern of technician courses and examinations", as described in the preceding paragraphs, can be realised only if the existing administrative structure is reorganised and simplified to make it more, and more quickly, responsive to the needs that are going to be expressed by all sectors of industry and commerce in the next five or

ten years. The further education service can be geared to respond with minimum delay and maximum effectiveness only if the new needs are expressed within the framework of an administrative system with responsibility over the whole national field. There must be adequate and co-ordinated arrangements for ensuring that technician and comparable courses and examinations of a national character are brought into being and kept up-to-date to match the changing requirements of industry and commerce, especially as expressed in the recommendations of the ITBs.

158. It is because of these considerations that we turn at once to the question of future administrative machinery for technician and comparable courses, and make recommendations on the form it should take.

Chapter VII — FUTURE ADMINISTRATIVE AND CO-ORDINATING MACHINERY

159. The present arrangements whereby CGLI (and to a lesser extent the CTEB) have responsibility over one area of provision, while a large number of joint committees each have responsibility for limited sectors of the other area, do not seem to us to be such as to ensure a national pattern of courses, examinations and qualifications which, while sufficient to meet all reasonable requirements, can be easily understood and kept reasonably compact. In the first place there is a need for overall co-ordinating machinery to ensure a proper relationship between the standard, form, length and content of the different types and levels of technician and comparable courses and qualifications. We think, too, that arrangements for co-ordination should include liaison with the CNAA and the bodies responsible in the neighbouring fields of professional and craft work if it is to be fully effective. Secondly, the existing administrative machinery does not appear to be particularly well suited to present and future needs. There is, for example, a large and increasing block of national certificate and diploma examinations work being handled by the DES apparently because the professional and other bodies most closely concerned cannot devote the necessary resources to it or have not the experience required for the work. Quite apart from this unsatisfactory administrative situation, it seems to us wrong in principle that the DES should be involved so closely with examinations. Again, there appears to be a lack of effective machinery for liaison between the various joint and other committees, and for reconstituting them, or at least altering their membership, to reflect changing interests and responsibilities. Finally, as will be seen from what we said in paragraph 155, there is no machinery covering the whole technician field whereby an effective joint planning relationship with the ITBs can be organised.

160. So far as we can see, adjustments here and there would not remove the unsatisfactory features of the present arrangements. It would be possible for us to recommend a number of comparatively minor modifications to meet some of the criticisms expressed about the existing separate parts of the system, but they would still remain parts and remain essentially separate, when what is needed in our view is a major move towards unification.

161. We considered whether it would be sufficient to establish an entirely new body to co-ordinate the work of existing bodies, on the lines of the "Technician Council" discussed in paragraph 142. Such a body would need to be very large if it were adequately to represent all the various interests mentioned. In practice, too, it would probably have to operate through separate "boards" or similar bodies for T courses, national certificates and diploma courses, and so on. The present joint and other advisory committees would remain to do the detailed work of syllabus-building and examining for the qualifications for which they are severally responsible. We would in fact end up with something like the existing system with a number of high level committees superimposed upon it, thus making it more complex than ever. Problems would arise in financing such a superstructure. There would also be considerable danger that whatever rationalisation and co-ordination were achieved would be at the expense of flexibility and of introducing procedures which had a delaying and deadening effect on the system. And the problem would remain of a growing volume of administrative work on national certificate and diploma examinations having to be done by the

DES unless the "Technician Council" took this over and became a kind of residual examining body itself.

162. We also considered whether we should recommend the setting up for England and Wales of bodies on the lines of the independent Scottish Association for National Certificates and Diplomas (SANCAD) and Scottish Council for Commercial, Administrative and Professional Education (SCCAPE). These bodies appear to be well suited to the situation in Scotland, where the numbers of students and colleges involved are comparatively small, and direct participation of a high proportion of teachers in syllabus-building and examining can more easily be assured. It does not follow, however, that similar arrangements would work equally well in England and Wales, where the numbers of students, teachers and colleges are substantially greater. Besides, the problem of co-ordination between the various examining bodies responsible for different kinds of technician courses would remain. To some extent these continue to exist in Scotland, where liaison between SANCAD, SCCAPE and the CGLI is effected chiefly through the SED, but they are manageable there because of the relatively small scale of operations.

163. In England and Wales the work of separate associations for national certificates and diplomas in the technical and business fields respectively would require to be co-ordinated not only as between these two bodies, but also as between them and the CTEB. This is because the constituent bodies of the CTEB operate in the T course field and also (with the exception of CGLI) in the national certificate field, and this for business as well as technical subjects. The need for such overall co-ordination, however, seems to bring us back to the idea of a "super body" of the kind discussed in paragraph 161, with all its inherent financial and other drawbacks. We therefore do not favour a straightforward "SANCAD/SCCAPE" solution for England and Wales. We are however of the view that the administrative machinery in Scotland includes certain features which might with benefit be introduced in England and Wales, with whatever modifications are needed to meet the different circumstances. They are embodied in the next alternative we discuss, which is the one we have decided to adopt and recommend.

Proposals for New Education Councils

164. If we could start off with a completely clean slate, we might feel justified in recommending the establishment of a single council to assume policy and planning responsibility for all technician and comparable courses, examinations and qualifications of a national character in both the technical and business sectors. In fact, we have considered whether it would be possible to give effect to such a recommendation on the basis of things as they are. We have concluded, however, that a single council covering the two sectors would be unsuitable at present having regard to the differences between the educational requirements, and the arrangements for meeting them, in the two sectors. We doubt, moreover, whether in the present stage of development a single council would be wholly acceptable to all the interests concerned. We are of the view, however, that it might well be to the benefit of students, their employers, professional bodies and the education service that such a single council should ultimately emerge, and we have been careful to frame our recommendations in a way that will not make this more difficult to achieve.

165. We think the time has come when a start should be made to drawing together under one body for each of the two main sectors, technical and business, responsibility for planning, co-ordinating and administering technician and technician-level courses, examinations and educational qualifications of a national character. To this end we recommend that the Secretary of State for Education and Science should set up as soon as possible a Technician Education Council (TEC) and a Business Education Council (BEC). We see these Councils as independent executive bodies served by their own staffs. Both Councils would be required to submit at prescribed intervals to the Secretary of State for Education and Science a formal report, suitable for publication, on the conduct of their operations during the period. We do not propose that they should be subject to policy and planning direction from a formally constituted single overall body, but we would nevertheless expect there to be strong consultative and operational links between the two, and in paragraphs 181-183 we make suggestions as to the form these should take.

Technician Education Council

Terms of Reference and Composition

166. The functions we envisage for the TEC are summed up in the following terms of reference:

> "To plan, administer and keep under review the development of a unified national pattern of courses of technical education for technicians in industry; and in pursuance of this to devise or approve suitable courses, establish and assess standards of performance, and award certificates and diplomas as appropriate".

167. We see the TEC as a relatively small policy making and co-ordinating body of not more than 15 to 20 persons drawn from the education service, industry (including the ITBs) and the technician and professional bodies. Members of the TEC would be appointed for their ability to contribute to broad policy forming, based on their knowledge and experience of further education and training, including examination and other testing and assessment work, at the appropriate level. We would expect them to be appointed by the Secretary of State in their personal capacity, for the most part after consultation with appropriate organisations and persons in education and industry. No doubt the Secretary of State would, when considering appointments, have regard to the probability that the load of work to be undertaken by the TEC would be heavy, at least in the early stages, and be prepared to consider if necessary some special arrangement in the case of the chairman to enable him to carry out his duties. Having regard to the nature of its functions, we think that a TEC comprising some two-thirds "education" members and one-third "other" members would be appropriate. We would expect the DES and the DEP to appoint assessors.

168. The TEC would, as soon as possible after its appointment, assume policy and planning responsibility for examinations and qualifications in the whole of the technician field at present covered by joint committees, the CGLI and the REBs. In due course, it would become responsible for syllabuses, assessment, and the award of educational qualifications. It would therefore require a suitable sub-structure of advisory committees to do the detailed syllabus and assess-

ment planning for particular subjects or groups of cognate subjects. The composition of these committees would be determined by the TEC case by case, but we would expect them to be representative of the main educational, industrial and professional interests concerned with the particular area of study. Organisations covering the interests of technicians would no doubt also be suitably represented.

The TEC's Approach to its Task

169. Among the earliest of the operations we envisage for the TEC would be to accept transfer from the DES of the administrative work at present carried out by the Department in connection with certain national certificate and diploma courses and examinations, including the servicing of the relevant joint committees. At the same time, the TEC would invite CGLI to transfer to it overall co-ordinating responsibility for existing T courses in the same and associated subject areas. The detailed timing and procedure for this transition would have to be settled by the Department and the TEC in consultation with the joint committees concerned and CGLI, although we would hope to see the first moves made soon after the TEC was set up.

170. As regards transfer to the TEC of responsibility for national certificate and diploma and T courses in other subject areas, it would not be possible for us to lay down any order in which responsibility for particular subject areas should be transferred, or to suggest a time scale within which the whole operation should be completed. Much would depend on the various factors at work at any given time in particular subject areas. In certain cases appropriate junctures for the transfer would present themselves naturally as a result of action from outside the education service as such. For example, the Engineering ITB will shortly publish its recommendations on technician engineer training and in consequence the education service will be called upon to review the whole pattern of technician courses for the industry. As will be seen from paragraph 215 we regard this as another priority operation for the TEC to undertake, and we would expect that it would do so in the context of its own Engineering Advisory Committee. Similar reviews of technician education would no doubt be called for in other industries, either by the relevant training board or, where boards do not exist, by other bodies with acknowledged responsibility for education and training. Under the new administrative machinery we propose, it would be for the TEC to carry out all such reviews. In any subject area where responsibility had not already passed to the TEC, the need for a review of the nature and/or purpose of technician-level courses in the subject would in our opinion constitute a juncture at which it would be appropriate for the transfer to be effected.

171. It would not, of course, be necessary to refrain from effecting the transfer of responsibility in a particular subject area until an opening of this kind presented itself. Indeed, we trust that all concerned with technician courses and examinations would readily see the merits of a unified national body for administration, course-building, assessment and award-making, do all in their power to help bring into full existence in the shortest possible time, and give it all the encouragement and support of which they were individually and corporately capable.

172. As we see it, therefore, the assumption by TEC of overall responsibility

for technician courses and examinations would require to be phased over a period, possibly lasting a number of years. Its early operations, however, would be critical. Its conduct of these should be such as to enlist the willing co-operation of the examining bodies affected (even where it meant the end of their own separate activities in their present form) in harnessing to itself the great fund of knowledge and experience available within these bodies and their advisory committees. It would have to convince students and employers that the relevance and value of TEC courses, and the currency of TEC qualifications, were at least as great as those they replaced. And, finally it would have to attract the confidence of technician bodies, and professional institutions with a technician grade of membership, so that not only would they willingly participate in TEC operations, but increasingly come to regard TEC qualifications as the normal basis for expressing their own academic requirements.

Business Education Council

Terms of Reference and Composition

173. We suggest the following terms of reference for the BEC:

> "To plan, administer and keep under review the development of a unified national pattern of courses in the field of business and office studies at levels below that of first degree; and in pursuance of this to devise or approve suitable courses, establish and assess standards of performance, and award certificates and diplomas as appropriate".

174. It will be observed that we do not suggest exactly similar terms of reference for the BEC as for the TEC. There is a considerable difference between the stage of development reached in technician education in technical fields, and that reached in comparable areas of further education in the field of business. This manifests itself in different patterns of courses; in different degrees of support lent by employers to the courses; and in different approaches to the concept of the "technician". As we have already explained, the pattern of courses in the non-technical sectors resembles that in the technical sector in some respects, but is unlike it in others. The degree of support for courses in business and other non-technical studies is markedly lower, relative to the number of employees who can be regarded as in one stage or another of training, than it is for those in the technical sector. The concept of the technician as a person requiring his own programme of training and education is for practical purposes unknown in the business sector, and the signs are that, with one or two exceptions, this state of affairs is likely to continue for some time. Professional and similar examinations are dominant over much of the field, and it is a far from straightforward matter to decide which of these are at "technician" level.

175. For these reasons, we do not think it would be right that the field of activity of the BEC should be restricted to levels of further education for business which are clearly comparable with technician levels in the technical sector. If it were, the national courses within the BEC's area of responsibility would be those leading to ONC/D and HNC/D in BUSINESS STUDIES, the ONC in PUBLIC ADMINISTRATION, and the retail management certificate. This would be an extremely narrow range of responsibility, and we do not see that such a Council could perform for business education generally the kind of overall co-ordination and development that this sector of further education lacks for the time being at

pre-technician as well as at technician stages. Hence our recommendation that the BEC should deal with courses and qualifications of a national character in business and office studies below first degree level. We do not, however, envisage that the BEC's responsibility would extend to "office skills" courses and qualifications. We recognise, however, that there may be a need for some form of enquiry into the present provision for such courses and qualifications.

176. As with the TEC, we see the BEC as a relatively small body drawn from persons of standing in the education service, the business world (including the commercial professional institutions) and industry. In general we would expect that the number of members, the method of appointing them, and the proportion of "education" to "other" members, would broadly follow the lines we have recommended in paragraph 167 for the TEC. Arrangements might have to be made, however, for the appointment of additional members to the BEC. We foresee a need, for example, for the closest liaison between the BEC and the Commercial and Clerical Training Committee of the Central Training Council, and this might best be assured by some form of cross membership. The ITBs, too, with their large interest in business and commercial training, would look to the BEC as the point of contact in the education service for joint planning of relevant programmes of education and training, and this interest would no doubt be reflected in its composition. The appointment of departmental assessors would be as for the TEC.

The BEC's Approach to its Task

177. The task facing the BEC would be markedly different in some respects from that which we foresee for the TEC. Although the BEC's function of administering courses and awarding qualifications would probably be on a much smaller scale, in terms of courses and students, than that of the TEC, its course-promoting and co-ordinating functions would be relatively greater. As we see it the BEC would not be so much preoccupied with introducing a new pattern of courses as encouraging more people to use existing courses, reinforcing these where needed, and introducing a much-needed measure of rationalisation into the multiplicity of professional and quasi-professional courses provided in the colleges at present to meet the separate needs of the large number of such bodies active in the business and commercial fields.

178. It would be an important function of the BEC to convince employers in all sectors of the business, professional and commercial community of the importance and value of releasing those training for occupations of responsibility to attend courses of further education in association with their training. In this task, which we would hope to see pressed forward from the outset, the Council would provide an especially valuable reinforcement to the efforts of the further education service, the ITBs and others, since it would be designing courses with the help of representatives of the professional bodies and business employers themselves, and could thus ensure that these courses were up to date and relevant to the needs of the trainees and their employers.

179. As soon as possible after it was set up the BEC would take over from the DES the administrative work carried out by the Department in connection with examinations for national certificates and diplomas in business studies, public administration and retail distribution, and arrange for the relevant committees to become committees within its own organisation. It would take similar action

with regard to the certificate in office studies, and the national committee which is responsible for this award at present. It would review the arrangements for the relevant examinations, assessment, and award of qualification.

180. In the longer term the BEC would consider, with the help of advice from the Central Training Council and the training boards, the nature and extent of the need and the demand for these and other types of national course with a view to developing a full pattern of courses, examinations and qualifications in the commercial field. In a later part of our report we suggest one or two lines of enquiry which the BEC might follow up in this connection. In carrying out this review the BEC would no doubt work in close co-operation with the commercial and professional bodies to ensure that the national courses went as far as possible to satisfy the academic requirements of these bodies for appropriate grades of membership.

Consultation between the Councils

181. As previously mentioned, we would expect the two independent Councils to forge strong consultative and operational links with each other. These would be essential to define the respective areas of operation of the Councils, and to agree on the allocation of responsibility between them in areas where this was in doubt; to agree policies and plans for courses and examinations in areas for which responsibility had to be shared because of the nature of the education involved (e.g. computer studies); to advise one another on subject "interchange", that is to say on technical subjects within business courses and vice versa; to keep each other informed and, where appropriate, adopt common policies on examination and other assessment techniques, and to consider ways and means of continuously reviewing and developing these; and to pool information and resources on more rapid and effective processing and publication of assessment results. Such links would also ensure that the policies and plans of each Council were broadly consistent with any longer-term plan to form a single council for technician and comparable education.

182. We would look to the two Councils to establish a standing consultative committee to keep these and similar matters of common interest under consideration. While the size and detailed composition of such a committee could be left to the two Councils to determine in the light of all the circumstances obtaining when they started to operate, we would expect the broad balance of "education" and "other" members on it to reflect that recommended for the Councils themselves.

183. The consultative links thereby established between the two Councils would be strongly reinforced and complemented by a common administrative support structure, and in paragraphs 187-192 we discuss and make recommendations on this. Before we do so, however, we offer advice on how responsibility for certain "mixed sectors" of education might be allocated between the two Councils.

Responsibility for Mixed Sectors

184. We use the expression "mixed sectors" to refer to occupational areas where the further education to be associated with training comprises a blend of commercial and technical studies, and it is not immediately obvious which of the two Councils should regard itself as responsible. The three largest of the

sectors we have in mind are the distributive, the hotel and catering and the transport industries. Having regard to the nature and educational tradition of these industries, and to the chief categories of employment within them, we recommend that the BEC should be responsible for courses for the distributive trades, while the TEC should be responsible for technician-level courses for the hotel and catering and transport industries. However, as with sectors of industry which are clearly "technical" for this purpose, e.g. engineering, the clerical and commercial and other "staff" trainees employed in these two industries would naturally follow further education courses within the responsibility of BEC.

185. The field of computer studies is common to both the technical and business sectors and, as we indicated in paragraph 181, responsibility for national courses and examinations at technician and comparable levels within it might have to be shared by the two Councils, with policy and planning based on advice from their standing consultative committee. Besides, there already exists in this field the U.K. Co-ordinating Committee for Examinations in Computer Studies representative of the appropriate examining, professional and other bodies concerned. Among other functions this Committee at present allocates responsibility for devising courses and conducting examinations in computer studies at levels below that of first degree or final professional qualification. We assume that in due course the TEC and the BEC would, through their consultative machinery, arrange with the Co-ordinating Committee to assume responsibility for technician and comparable courses in this extremely important field.

186. There are no doubt other sectors where it would not be clear which Council should be responsible for the further education. Where these cases occurred, and no clear guidance as to responsibility could be derived from past practice, the two Councils would determine the matter through their standing consultative committee, if necessary calling for advice from the education departments, the ITBs and others concerned.

Administrative Organisation of the Councils

187. We have so far discussed the terms of reference and composition of the two Councils, the way in which we see them approach their task, and the arrangements they might make for standing consultative machinery. We now turn to the equally important question of how to service them and their advisory committees, translate their policies and plans into action, and carry out the whole complex of administrative work which would arise from the operations of bodies of this nature.

188. The Councils' task would be the co-ordination, unification and further development of something that already existed in one form or another. The very solid foundations on which their work would be based have already been laid by a number of existing bodies each with its own administrative organisation. It seems to us of the essence of our proposal that this administrative know-how and experience should be placed at the disposal of the new Councils. In the circumstances we are convinced that it would be preferable to base them on an existing body rather than to create an entirely new organisation.

189. We have carefully examined the nature, scope and functions of the existing organisations in the field with which we are concerned, and as a result we

recommend that the City and Guilds of London Institute should be invited to undertake the administrative work of both the TEC and the BEC*. There are a number of reasons for this choice. The Institute is the only body with an existing administrative organisation adequate in size and experience for a task of the magnitude and complexity implied in the terms of reference we have suggested for the two Councils. It is already responsible for the majority of all candidates currently taking examinations which would come within the ambit of the TEC, and has in fact played a major part in moves to establish and develop T courses in this country. It has wide experience in the administration of technical education syllabuses and examinations, including those for technicians and comparable grades in certain non-technical sectors, notably distribution. It has experience of administering examinations for other, independent, bodies. It can provide the links with craft courses which we would judge to be necessary if the co-ordinating activities of the TEC in particular were to be fully effective. The currency of its own qualifications is widely understood and accepted throughout the United Kingdom, and it is our conviction that its administration of the new Councils would help to attract a similar degree of recognition and acceptance for the new-style national qualifications. Finally, its record in the field of education generally has earned it a very high reputation, nationally and internationally. The new Councils would surely benefit much from close association with such a body, especially in their critical early days.

190. We would readily acknowledge that, at this point in time, our reasons for recommending that CGLI should be responsible for the administrative support work of the new Councils will be regarded by some as applying with much greater force to the TEC than to the BEC. Traditionally, the Institute's involvement with courses and qualifications has been predominantly (although not exclusively) with technical rather than business or commercial fields of study, and to some concerned with business and office studies it may well seem something of an unknown quantity. It is not unprecedented, however, for technical and business courses and examinations at technician and comparable levels to be administered by the same body. The DES does this at present in the field of national certificates and diplomas, and the REBs are also involved to some extent with both technical and business syllabuses and examinations. In our view the organisation and experience of the CGLI is such that it can rapidly and successfully apply its talents and resources to new fields of study, and we are confident that it would quickly demonstrate this ability in relation to its work for a BEC. Moreover, as we have previously made clear, we would wish to see strong consultative and operational links between the two new Councils, and we can think of no better way of preparing the ground for this than by recommending that they share the same administrative support structure.

191. Under this proposal as we envisage it, the two Councils would be independent bodies responsible for the making and directing of policy in their respective fields, with each drawing on the resources of the CGLI for all servicing and other administrative needs. In such a situation there would clearly have to be certain safeguards if the Councils were not to develop into sub-divisions of the Institute itself. Conversely, the Institute would require certain financial and other assurances that its services to the Councils would not make unreasonable demands

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*Mr. W. F. Crick dissents from this recommendation as it relates to the proposed BEC. See Note of Dissent at the end of the main report.

on its resources. We do not think that these aspects need present insuperable problems, given close and sympathetic liaison between the new Councils and the Council of the Institute. We understand that the Institute has current plans to strengthen local education authority and teacher representation on both its Council and its Education and Training Policy Committee. This seems to us a happy coincidence, since a broad similarity of composition as between these bodies and the two new Councils would make for a common understanding of responsibilities and functions which would be of no small benefit to the practical application of our proposal.

192. If our recommendations are accepted, and the Institute subsequently accepts an invitation to provide the administrative base for the new Councils, there will of course be a number of important practical details to be settled. These would include the definition of the lines of communication between the new Councils and the Council of the Institute; the arrangements for employing staff, especially the more senior staff, serving the Councils; their working relationships with their Institute colleagues; their several areas of responsibility; and so on. We would be inclined to the view that in practice it might be convenient all round for senior and other staff serving the TEC and BEC to be employed by the Institute and formally seconded for duty with their respective Councils, so obviating the need for the latter to occupy themselves with "establishment" matters. There would also be the question whether the new Councils should themselves account for the income and expenditure resulting from their activities, or whether this might not better be dealt with as part of the Institute's general accounting operations. In this case, in view of what we have to recommend in the next section of our report about financing the Councils, we think it would be more appropriate for their activities to be the subject of separate accounts, which could be published in suitably abbreviated form as part of their periodical reports to the Secretary of State. It is clear, however, that the last word cannot be said on these and similar matters at this stage. In our view they can safely be left until the whole project is much nearer realisation in principle, and a more detailed assessment can be made of all the practical issues and the best answers to them.

Financing the Councils

193. At present, we understand, all aspects of administrative work in connection with technician and other examinations are financed mainly from income accruing to the various administrative bodies from examination fees. We see no reason for departing from this general principle in the case of the examinations for which the TEC and the BEC would increasingly become responsible, but we consider the present application of the principle to be wasteful, and to carry within it the seeds of danger to the proper development of techniques and methods of assessing the performance of students.

194. A single examination fee may go through the hands of a student, his employer, his college, and his local education authority before it reaches the examining body. A training board, too, may be involved if the employer makes a claim for grant. No doubt an appropriate accounting action has to be taken at all stages. One cannot but feel that the administrative cost of such a procedure must in each case amount to more, perhaps much more, than the amount of the fee. It seems to us that it would be simpler and cheaper for lump sum payments to be

made to the new Councils in respect of fees for assessing students on courses leading to their qualifications. The elimination of the costly administration which falls to be carried out under the present arrangements would itself justify a move towards such a system. In our view, however, there are other and at least equally cogent reasons for seeking to adopt it.

195. A system of student assessment which depends on income from individual examination fees to meet all or even the major part of its operating costs must inevitably tend to perpetuate, even accentuate, the emphasis on external examinations, since this is the only safe way open to the examining bodies of securing their income. The energies of the examining bodies in such circumstances must to some extent be dissipated in the pursuit of economic objectives instead of being focused wholly on educational objectives. Decisions about the form and frequency of external examinations are sometimes taken, for the wrong reasons. This seems to us a most unsatisfactory state of affairs. As we explain later on in this report, we think the time has come to move away from the present emphasis on external examinations in favour of the introduction of continuous assessment and other internally applied techniques, with external checks kept to the minimum consistent with the attainment of broad national standards. We wish to see the TEC and BEC give a lead in this direction. But they can only evolve, develop and apply new techniques of assessment if they can be assured of an income which does not depend solely on fees for external examinations.

196. There is another reason for adopting a different approach to financing the activities of the new Councils (and, indeed, other further education examining bodies of a national character). As has already been pointed out by the National Advisory Council's Committee on Resources*, the nature and timing of external examinations at present militates against the optimum use of teaching resources, buildings and equipment by dictating to a large extent the productive length of the college year. While we do not claim that all problems of this nature could be overcome simply by altering the method of securing an appropriate income for the examining bodies, we do hold strongly to the view that such alteration would permit the development of a much more flexible system of assessment—which the growth of block release and modular courses will in any event demand in the near future—and lead ultimately to greater productivity in the technical education system.

197. Local education authorities, through the colleges, normally collect a tuition fee from a student enrolling on a technician or comparable course of a national character. The fee for the examination taken at the end of the course is collected later, again through the colleges, for transmission to the relevant examining body. We recommend that local education authorities should be invited to collect in future a composite course fee, covering both tuition and examination elements, from students enrolling on courses leading to qualifications within the responsibility of the TEC and BEC; and to pay each year to the two Councils a lump sum representing the total of the examination element of the course fees so collected, divided between the Councils on the basis of the number of students enrolled on each of the several courses leading to their respective qualifications. The amount of the examination element for a given course

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*Report on the Use of Buildings and Equipment: NACEIC Committee on the More Effective Use of Technical College Resources, 1968.

or range of courses would be agreed from time to time between the Councils and the organisations representing local education authorities. As the course fee would normally be paid by the student annually, the examination element would have to be averaged out over the number of years in the course. In cases where the local education authority did not charge a tuition element, it would be invited to collect from the student a course fee which represented only the examination element agreed with the Council concerned. In this way the Councils would receive their main income from examinations by way of lump sums paid to them annually by the local education authorities; they would be assured of a contribution from all students who enrolled on their courses, and not only those who took examinations (which, given the high cost of developing new courses—see paragraph 198—would be no more than just); and the overall cost of collection and administration would be greatly reduced, both for local education authorities and the Councils.

198. Besides meeting costs directly concerned with examinations the Councils' income would have to meet the cost of revising existing courses, and devising new ones, to match the training recommendations of boards; of developing new methods of assessment and examination and testing techniques; and of developing new and more rapid systems of producing and publishing results. For these reasons, we recommend that the Exchequer should meet part of the Councils' costs, at least until such time as the scale of their operations assured them of a sufficient income from fees. The amount of such grant would have to be decided from one year to another in the light of the probable overall income and expenditure position of the Councils. In considering this recommendation, regard would no doubt be had to the fact that the DES would be relieved of responsibility for administering its present range of national certificate and diploma work.

199. We are aware that the system we propose for financing the Councils would require detailed discussion and consultation, especially with the associations representing local education authorities, before it could be put into effect, but we see no insuperable obstacle to its realisation. We are convinced that it would be cheaper for all concerned and easier to administer than the present arrangement and, by permitting the creation of a more flexible and effective system of assessment, lead to better and more economical use of college resources.

A Role for the Regions

200. We foresee that, with the growth in the number of technician and comparable courses and students and the application of new assessment techniques, the administrative support structure of the TEC and BEC might require a regional as well as a central organisation. This would in our view be a most desirable development, for we would be anxious that the unified administrative system we propose should include within its framework a substantial and positive role for regional examining organisations. These would have close working links with individual local education authorities, colleges and teachers, and with regional course-planning and training board organisations. Through such contacts they would acquire an intimate knowledge of the further education system in their regions; of the education and training needs of industry and commerce, and of how effectively these were being met; and they would be able directly to involve in the work of the TEC and BEC the local education authori-

ties, teachers, industrialists and business men acquainted with the situation on the ground. These regional organisations would be responsible for making the TEC and BEC aware of regional needs, and for making proposals designed to meet these needs. They would constitute a direct working link between the Councils and those who provided and used their courses, and serve to remove any impression there might be that the Councils were too remote from the actual centres of education and training to be able to plan and operate a really effective pattern of technician and comparable education. And not the least valuable aspect of their contribution would be the opportunity they afforded to many, in both education and training, who had much of value to offer but would otherwise be denied full scope for active participation in the advisory and administrative structure.

201. While policy matters such as curriculum structure, subjects to be examined, syllabus content, examination and other assessment methods would be settled by the Councils—with advice as necessary from the regional organisations—much of the conduct of the actual examining operations could be decentralised and carried out at regional level. Where an industry was mainly centred on a particular region it might well be that the planning of associated syllabuses and the conduct of the examinations could be operated from the relevant regional organisation which, for this sector of the work, would cover the country as a whole, subject only to such policy directions as the Councils might impose.

202. The work of the regional organisations would not, however, be limited to those areas of further education peculiar to the industrial and business activities within their own particular regions. Some very popular courses of further eduction are to be found in all parts of the country. It might well be that the conduct of examinations for these courses could be undertaken partly at the centre and partly by the regions. By spreading the load in this way the delays which are frequently characteristic of an over-centralised system could be reduced or even eliminated. Whether in such cases all the regions should offer a national examination determined centrally, or whether the regional organisations should, in conjunction with the Councils, design their own examinations would be a matter for the Councils themselves to decide. Clearly, one advantage of a regional system centrally controlled would be that the extent to which examining was delegated from the centre to the regions could be determined by economic as well as educational considerations, and wasteful duplication of examining services could thus be avoided.

203. Following the principle that the new Councils should benefit from existing knowledge and experience, it would be our desire to see their regional support structure based on existing bodies if this were possible. The CGLI has no regional organisation as such, but the REBs are associated through the CTEB with the work of the Institute in the technician field. They are external examining bodies for T courses at the Part I stage, and provide an external agency service for certain colleges in connection with ONC (and in a few cases HNC) syllabuses and examinations. However, with its emphasis on co-ordination and further development of national courses and qualifications, and on the development and application of assessment techniques other than the purely external examination, the new unified system could not in our view accommodate regional organisations carrying out the present separate and independent external examining functions of the REBs. If, however, the REBs were to be integrated

with the administrative support structure of the TEC and BEC, they might well form a suitable nucleus of the pattern of regional organisations of the kind we are discussing. We refer to this again in paragraph 205. As their activities do not extend to all regions of the country, however, it would be necessary for complete geographical coverage to create regional organisations to serve areas not at present covered by REBs.

204. Since these proposals, if implemented, would involve a major reorganisation of the existing regional examining system, it would in our view be worthwhile considering whether a new arrangement might be made whereby the Regional Advisory Councils (RACs) were involved in the exercise of the examining function at regional level. Five out of the six existing REBs are already closely linked with the corresponding RAC; in most of these cases the Secretary of the REB is also Secretary of the RAC. It is not at present practicable for us to make any firm recommendation concerning the future relationship between RACs and the regional examining organisations we propose, since the future of the RACs themselves may well need to be re-appraised in the light of the recent report of the Royal Commission on Local Government. In our view, however, the aim should be an arrangement whereby the RACs and the regional examining organisations covered identical areas, and were also closely linked operationally. There is obvious logic in organising the further education system in such a way that those who are responsible for planning the provision of courses in a region, i.e. the local education authorities and teachers, should also play a part in operating the system used for examining the students at the end of the courses. Also, in the light of what we say in paragraph 197 about financing the Councils, and in paragraphs 200 to 202 about the desirability of a positive regional role, it would clearly be desirable for local education authorities and teachers to be involved as closely as possible in both these aspects of further education at regional level.

205. As a preliminary step towards a pattern of regional examining organisations on the lines indicated, we recommend that the CGLI and the REBs should consider extending the important but limited co-operation at present undertaken within the CTEB, and drawing closer together to form a unified administrative organisation for the examination, testing and general assessment of performance. This might take the form of a federation or other suitable framework. Such an organisation would not necessarily be restricted to activities in the technician and comparable fields within the ambit of the TEC and BEC. Indeed, the full benefit of a federation or similar unified operating structure would be realised only if it covered the whole range of work in which the bodies concerned are engaged. Already the work of the CTEB has shown that advantages to students, employers and the further education and training service, as well as to the examining bodies themselves, can accrue from co-operative effort at the planning level. If this co-operation were to be extended to all aspects of the assessment processes themselves, it would almost certainly result in economies of operation and increased efficiency in the system, while at the same time rationalising and simplifying it in no small measure. We hope that the seven bodies concerned will give our suggestion the most serious consideration in the near future. A single administrative structure in support of the TEC and BEC would be an important step along the way to a unified system of examinations and assessment for all national further education courses other than those within the scope of the CNAA.

Summing Up

206. We recognise that these proposals for a new administrative structure are far-reaching, and that they go beyond anything suggested to us in evidence. We are aware that they could not wholly be put into effect in a short time, and that it might indeed be a number of years before transition from the existing to the new system was complete. Nevertheless, we are convinced that the time has come for a fundamental reshaping of the administrative structure for technician and associated courses, examinations and qualifications, and that what we have outlined constitutes a sensible and practicable plan to meet this need. It offers the possibility of relatively quick action to remedy a number of the deficiencies in the existing system, notably the general lack of co-ordination, the absence of a recognised point of contact for the training boards and other industrial and commercial interests, and the lack of a suitable agency to take over examinations work from the DES. On the other hand, it enables matters such as the development of new patterns of courses and qualifications, the extension of the proposed Councils' area of direct responsibility, and the building up of contacts with other examining and professional bodies, to proceed more gradually, and at a pace in any particular direction as may suit the case. And it will in the end, we are sure, result in a coherent, effective and more easily understood system for the administration, co-ordination and development of technician and comparable courses in all sectors of further education for industry and commerce.

207. We should not terminate this part of our report without addressing a special word to the joint and other committees, and to the representatives of industry and professional bodies who have contributed so much to the work of these committees in the past. Under the unified administrative structure we propose, joint committees for national certificates and diplomas, and CGLI/REB advisory committees concerned with T courses, would give way in due course to corresponding subject advisory committees of the TEC and BEC. We would very much hope that persons outside the education service who have devoted so much time and effort to the promotion of technician education would not feel that, with the passing of these committees, their opportunity to serve had come to an end. Just as the many separate bodies do under the present system, so the TEC and BEC would need the benefit of their knowledge and experience under the new. As we have indicated, there would need to be voices reflecting industrial and professional interests in the new policy-making Councils. There would also be wide scope for continued service on their advisory committees. Thus would be maintained the working relationships that have developed over the years between industry and commerce, the professional bodies and the further education service in devising and administering courses at this level. It is no part of our intention that these relationships should disappear or become less effective with the unification of technician and comparable courses under the new banners. On the contrary, we hope to see them fostered in every possible way, so that the professional and technician bodies might increasingly contribute to the work of the new Councils where it impinged on their own membership and other interests; and through this participation work progressively towards a situation where their professional requirements were integrated with and reflected in the system of national technician courses, so that they found it not only possible but natural to offer on an increasing scale exemptions from their own requirements in respect of TEC or BEC qualifications.

But we do mean that for all branches the minimum age and standard of entry, the length of each stage, and the time given to study during each stage should be about the same, so that the standard of the qualified technician in one branch would be of the same order as that of his counterpart in another. In this way, technician qualifications awarded by the TEC at the end of a given stage within the new course pattern would, irrespective of the subjects covered, come to be regarded throughout industry as broadly equivalent to one another. The TEC would no doubt ensure that the titles of qualifications reflected this equivalence as between one course and another, or between comparable stages within courses.

New Pattern of Courses for Engineering Technicians

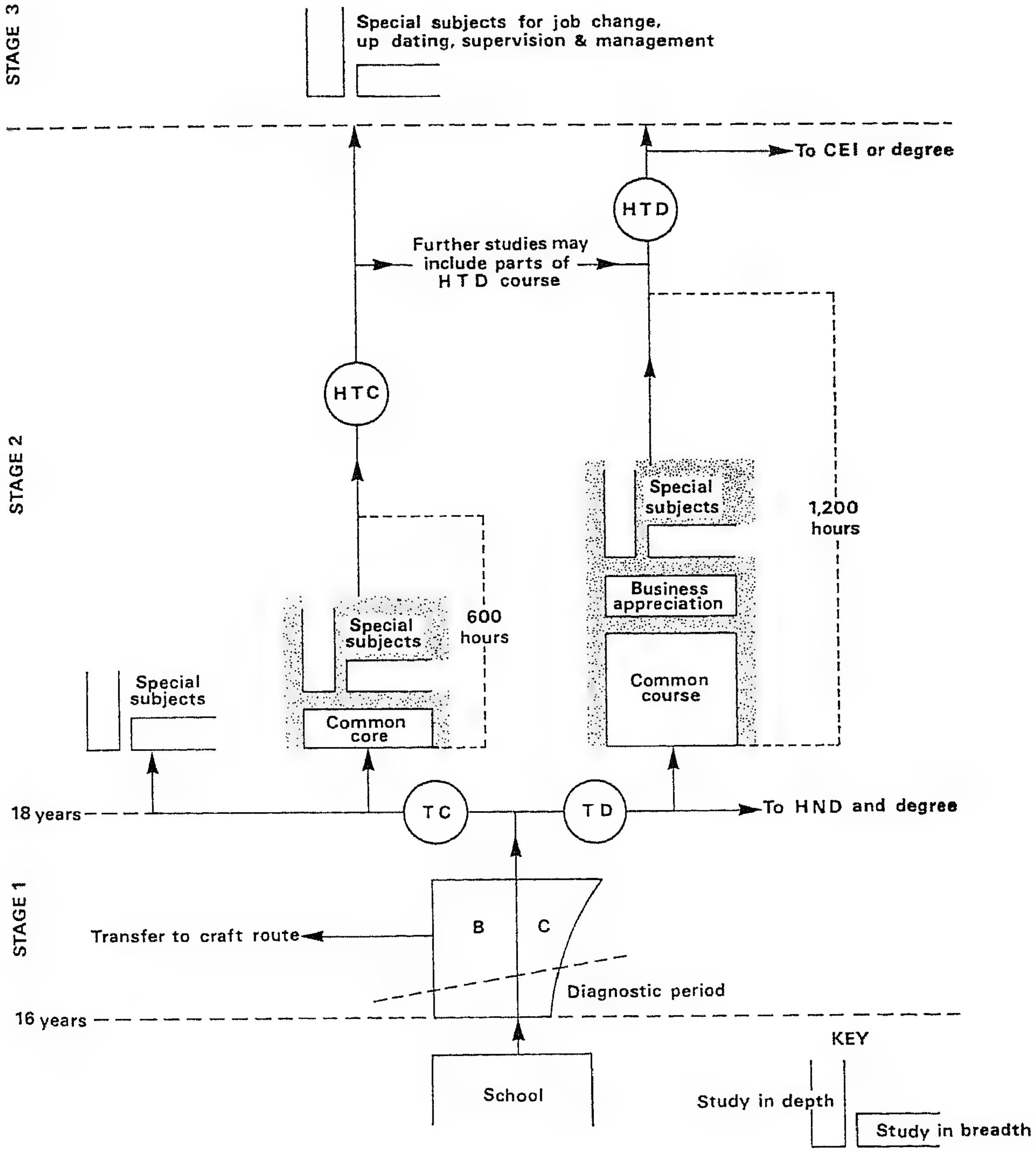
215. As we have already indicated, technicians are beginning to form a recognisable and distinct group in the engineering industry more than in any other, and the Engineering Industry Training Board is developing training recommendations designed specifically for technicians in the industry. It will as a result be necessary for the TEC to take early action to reappraise existing technician courses in engineering. We recommend that when they do so they should introduce a new pattern. The "main routes" within this are shown opposite in diagrammatic outline (Figure 1), and the complete pattern is described in detail in Appendix No. 7. It enables a suitable educational complement to be provided for the training at all necessary stages, envisages the abolition of the existing separate T and national certificates/diploma routes, but keeps open different progressive routes for students with different educational backgrounds and with different needs and aspirations.

216. As will be seen, features of the pattern include flexibility in the entry requirements at the first stage, which would normally begin at 16 years of age, and the embodiment therein of a diagnostic function. This is to enable the college and the employer to decide on initial admission and, after the student has shown something of his capabilities, on the particular route he is to follow. There is a basic educational course to complement the Board's training programme (block B on diagram). This is taken by all 16-year-old entrants, and it leads to the award of a Technician Certificate. Students requiring a more extensive theoretical background to their studies may supplement this basic course with a more academic element (block C on diagram). Depending on which blocks of study are covered, the resulting course can lead to a Technician Certificate or Diploma (TC/D), and thence to the next stage of Higher Technician Certificate or Diploma (HTC/D). Whether a Certificate or a Diploma is granted in a particular case depends on the field of study covered and the results obtained. Unlike the present system, it will no longer depend on the pattern of attendance at the college.

217. It is to be expected that many technicians will reach their academic ceiling at the Technician Certificate level. They will then be at a stage when they should be beginning to undertake responsible assignments in industry related to the particular occupation for which they are being trained. An important part of these proposals, therefore, is that special courses should be available, of varying lengths according to the demands of the topic, closely related to current industrial methods and techniques, or to new ones arising, e.g. the production of integrated circuits, data processing, work study, and so on. Students continuing to study for formal qualifications should also be able to incorporate appropriate

MAIN ROUTES

Figure 1



topics of this kind in their main course. We foresee that courses in special topics will also be available at the post HTC/HTD stage. It may well be that in some cases courses of this kind would be appropriate for students at various academic levels, and for students following other than technician courses. For example, university graduates coming into industry may find such courses in special topics useful in providing a background to their activities at work.

218. It is envisaged that there should be provision within the pattern for those who qualify for the Technician Diploma at the requisite credit standard of performance, to proceed from there to a degree course or to an HND course instead of to one of the new higher technician courses. There will also be provision for 18-year-old school leavers to enter one or other of the higher technician courses, if necessary after a suitable orientation course. Suitable craftsmen may enter the system at appropriate points at the discretion of college principals. Thus, the whole scheme is sufficiently flexible to enable any potential technician to gain entry to it and, once admitted, to find his proper level. The fact that it would be administered by a single TEC would greatly facilitate the detailed working out of courses of study, and arrangements for vertical and horizontal transfer within the pattern.

219. We further recommend that this pattern should be adopted in due course as the basis for the provision of technician courses for other industries besides engineering, and we would see its introduction in engineering as no more than the first step towards the attainment of a new technician course pattern common to all technical fields. We realise that the timing of its introduction would vary from one industry to another, and that a substantial period might be needed before it became established as the universal pattern, but we would see no reason why there should be undue delay in making a start to its application in any field as soon as appropriate circumstances of the kind outlined in paragraph 170 presented themselves.

220. We foresee the possibility that some confusion on nomenclature might arise when the new-style courses and qualifications were introduced in a particular sector, especially during the period when the old-style courses and qualifications were being phased out. This risk is of course inherent in any changeover of the nature we propose, and we see no certain way of avoiding it completely. However, the TEC would no doubt take steps to minimise it by making it clear to those concerned at the appropriate time that the new titles referred exclusively to the new-style courses and qualifications, and that there could be no question of awarding old-style qualifications for new-style courses, or vice versa.

Future of the G Course

221. In paragraph 96 we referred to the need to re-examine the future of the G course in the light of the projected raising of the school leaving age to 16 in 1972-3. Clearly, there will no longer be any question of a two-year G course thereafter; the question remaining is whether it would be worthwhile continuing with even a one-year G course. The extra year of compulsory secondary education, and the further development of CSE examining techniques leading to better prognosis of young peoples' true capabilities for undertaking further education and training, will undoubtedly reduce the need for the G type of course, and indeed we think it should be possible to dispense with it altogether when the school leaving age goes up.

222. We therefore recommend that G courses should be phased out after 1972/3, subject to suitable transition arrangements for students already taking the course. In fields of further education such as engineering the new pattern should be operating by then. Where this is the case, the 16-year-old school leavers who show promise of qualifying as technicians should go straight into the Technician Certificate stage. As we pointed out in paragraph 216, this stage embodies a diagnostic function, and this will enable the college and employer to decide on the technician route he is best suited to follow (or, in what is hoped will be a minority of cases, that he should transfer to a craft course).

223. In fields of further education where the present technician pattern is still operating in the post-1972/3 period, students who would in other circumstances have entered a G course should instead enter the first year of the T course reconstituted so as to include additional subjects for students whose aptitudes indicate that they may be suitable for transfer to the first year of the ONC at the end of T1 stage. A T course of this kind would resolve the dilemma to which we referred in paragraph 93 and it would at the same time legitimately resolve the numbers problem of colleges which are at present forced to adopt the practice, which we mentioned in paragraph 94, of combining the G and T1 years.

Future of the Higher National Diploma in the Technical Sector

224. In paragraph 218 we refer in the context of the new pattern for engineering technician courses to an outlet from the Technician Diploma course to the HND course. It is therefore appropriate that we should comment on the future of higher national diplomas in the technical sector generally since the new pattern would apply to the whole of this sector in due course. As we indicated in paragraph 107, one of the questions arising from our evidence concerned the need for the HND at all, given the availability of so many degree courses and the power of the CNAA to approve college courses leading to ordinary degrees.

225. To question the need for the HND because degree courses are freely available seems to us to misconceive the position. The HND is not equivalent to a degree, ordinary or otherwise. It is normally awarded for successful completion of a two-year full-time or three-year sandwich course with a minimum entry standard of one "A" level pass; a degree is awarded after a three-year full-time or four-year sandwich course with a minimum entry standard of two "A" level passes. If HND courses are no longer required, as some argue, it is not because the students who take them could just as easily and appropriately follow a degree course. We appreciate that in one or two exceptional cases the HND course is three years full-time in length, but the minimum standard of entry to them is still one "A" level.

226. In fact, the HND course meets the educational requirements of holders of "A" levels and ONC/D who do not possess qualifications for entry to a degree course but who nevertheless have the potential for higher technician responsibilities and can benefit from a full-time or sandwich course at the highest technician level. It also meets the need for a suitable "fall-back" course for students who, after starting a degree course, find it too hard for them. In our view, none of the developments that have taken place in higher education in recent years has resulted in a suitable alternative for students in these categories, so that the HND is still needed.

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topics of this kind in their main course. We foresee that courses in special topics will also be available at the post HTC/HTD stage. It may well be that in some cases courses of this kind would be appropriate for students at various academic levels, and for students following other than technician courses. For example, university graduates coming into industry may find such courses in special topics useful in providing a background to their activities at work.

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227. Future developments are likely to remove this need. The introduction of

ordinary degree courses, perhaps coupled with some relaxation in the present requirements for entry to degree courses (which are basically geared to the standard needed for an honours course), would probably attract many students away from HND courses. Certainly we would foresee that the introduction of the new pattern of courses we propose for engineering, including as it does an HTD, would lead to the phasing out altogether of HND courses in engineering. The exact timing of this step would be for the TEC to decide. It would no doubt first take steps to ensure (i) that provision was made for suitable students to transfer (either directly or through a bridging programme) from the HTD to a degree course; and (ii) that the HTD plus whatever supplementary studies might be needed would attract from professional bodies at least the same degree of recognition as is now accorded to the HND. We think it should be possible for the TEC to make these arrangements within two years from the institution of the new-style courses and qualifications, and thereafter begin to phase out the HND in Engineering.

228. We would also foresee a similar diminution in demand and ultimate phasing out of the HND in other fields of study as and when the new pattern of technician courses came to be extended to them. In other words, we think that the future of the HND in the technical sector is limited. Until the new dispositions to which we refer are made, however, we think HND courses should continue to be provided in this sector, and we so recommend. It would be for the TEC to judge in each case when they should be brought to an end.

The Business Sector

229. Insofar as we are able to judge from the evidence submitted to us, existing courses leading to ordinary and higher national certificates and diplomas in business studies appear to suit the broader educational needs of the business and commercial community as these are at present expressed. We do not, therefore, recommend any general change in the present pattern, nor in the length of the individual courses. We would foresee, however, and we indicated as much in paragraph 180, that the BEC would wish to take an early opportunity of reviewing all aspects of these and other courses of a national character in business and office studies, including their effectiveness in meeting the needs of employees engaged in production and other technical areas. In particular, we would assume that the Council would undertake a close re-examination of the nature and purpose of the HND in business studies.

Higher National Diploma in Business Studies

230. The role of the HND in business studies differs generally from that of its counterpart in engineering and other technical fields. In business studies the HND is designed specifically as a "technician" type qualification marking the successful completion of a two-year full-time or three-year sandwich course covering general business subjects, but also incorporating one or more optional specialisms (e.g. marketing, statistics, transport, and so on), selected by the student to match the needs of his particular job or his prospective career. In one or two cases a "specialist" HND of this kind attracts a measure of exemption from the final examination requirements of the associated professional bodies. As with other HNDs, the basic entry standard is a pass in the ONC or OND, or one "A" level pass in the GCE.

231. As we indicated in paragraph 116, however, the two-year full-time HND course in this field is followed by many students who have qualified for but failed to obtain a place on a degree course, usually because they wanted to study an arts subject. The subsequent difficulties these students experience in obtaining suitable employment implies a considerable waste of talent, and we would expect the BEC to take early action with the ITBs and the business community generally to remedy this situation. This might best be done by (i) developing the HND exclusively as a three-year sandwich course with the existing minimum entry standard; and (ii) taking steps to promote a further increase in the number of places on degree courses in business studies for students whose interests lie in this direction, and whose academic attainment is fully comparable with that of their fellows who currently find it relatively easy to gain entry to degree courses in science and technology. We are aware that action on the second of these fronts would depend in the last resort on bodies other than the BEC, but we would nevertheless be confident that the BEC, through its links with such bodies, could do much to stimulate it.

Business Studies and Professional Qualifications

232. We pointed out in paragraph 112 that national certificate and diploma courses in business studies at the ordinary level are used primarily as the first step on the road to a business professional qualification, and the advice we would wish to offer the BEC in regard to them deals chiefly with this aspect.

233. The present arrangements, under which many of the leading commercial professional bodies give exemptions from certain of their own requirements to holders of ONC and OND, represent a considerable advance on the pre-1961 situation. They mean that the students are no longer forced to choose a special profession to aim for at the age of 16; the further education service is no longer asked to provide such a wide variety of intermediate professional courses the syllabuses for which closely resemble one another in practically everything except the titles given to the subjects; and the professional bodies' needs are still met satisfactorily on the basis of a broad course covering a wide range of commercial knowledge followed by the necessary specialist education at a later but still appropriate stage.

234. Despite the satisfactory progress made in matching ONC and OND courses to professional requirements in the business field, we think there is still a very long way to go before the possibilities in this direction can be said to be exhausted. The clear aim at this level should be to establish the ONC and OND as qualifications attracting straight exemption from the whole of the intermediate requirements of all the leading professional bodies in business. In contrast to this, however, it is the case at present that not all such bodies are prepared to grant even subject-for-subject exemption to holders of these qualifications. Some do not even recognise that the holder of an ordinary national qualification with credits has attained a level of education which compares with that attained by the holder of a GCE with one or two "A" levels, besides having had a much more suitable basic preparation for a professional career in business. Such bodies might, if they have well-founded objections at present to granting exemption from their own examination requirements, at least treat ONC and OND holders in the same way as "A" level holders for the purposes of their entrance regulations.

235. The possibilities of exemptions from stages beyond intermediate level in respect of higher national certificates and diplomas do not appear to have been exploited to any significant degree. There have been some moves in this direction, but relatively few. Professional institutions who regard their academic standards as being met only by a degree or comparable qualification might follow the example of the Institutions of Chartered Accountants by considering the introduction of a "second-tier" grade of membership for which the higher national qualifications, with a minimum of added specialist education, would serve admirably as the academic requirement. These are possible moves which we recommend the BEC to investigate with the leading professional institutions in commerce. As we see it, their adoption would offer much benefit to the institutions themselves, to the young people concerned, and to the system of educational provision.

236. Finally on this question, it is considered that in the commercial field (as indeed in others) there are many professional and similar associations whose academic requirements for membership are capable of being met by something less than first degree or higher national qualifications. It would be of considerable benefit all round, and bring some much needed rationalisation into a very tangled field of provision, if such bodies were to state their requirements in terms of the technician-comparable courses provided on a national basis, thus widening the area of exemptions and at the same time reducing the number of quasi-specialist courses, the real need for which is at least open to question.

Supplementing the Existing Provision

237. We referred in paragraph 111 to a suggestion made to us in evidence that there is a place in this field for a specifically diagnostic one-year course to lead either to the ONC or, in certain cases, to the second year of the COS. It is not self-evident to us that a separate one-year course of this kind is necessary. Apart from anything else, its introduction might well have a detrimental effect on enrolments to the COS course. We are prepared to accept that there is a case for a diagnostic process at this level in the field of office and business studies, but this might well be incorporated into the first year of the COS itself without introducing a new course. This alternative would be more in line with the proposal we have made in paragraph 223 in relation to the future of the G course in certain technical fields. No doubt the BEC would examine all aspects of this question at the appropriate time.

238. In paragraph 111 there is also a reference to an "end-on" type of business course for people already proficient in office skills, and paragraphs 114-115 raise the associated question of an OND course in secretarial studies. These are interesting suggestions which deserve further study. We must ourselves confess to some doubt as to whether a separate progression of secretarial courses at technician-comparable level is really required. Given sufficient flexibility within the existing pattern of courses in office and business studies, we would have thought that this would be enough to meet the needs of those preparing themselves for high grade secretarial work. Otherwise, we foresee that the two existing routes, i.e. that in office studies and that in business studies, would be matched by yet a third route, for secretarial studies. This would appear to us to be unnecessary and wasteful of resources, but no doubt the BEC would examine the position in greater detail before arriving at a final decision one way or the other.

239. Having regard to the fact that, if our recommendations are accepted and put into effect, the titles "Ordinary and Higher National Certificates and Diplomas" will in due course disappear from the technical sector of further education, we have considered whether we should make any recommendation about changing the titles of the corresponding courses in business studies, but we have decided against doing so. Following from what we said in paragraphs 3-4 in the introductory chapter of this report, we think it would be inappropriate to suggest using in this field the "Technician" appellation which will be the mark of the new qualifications in the technical sector. Besides, we have advised in paragraph 220 the establishment of the principle that new-style qualifications should be awarded only for new-style courses. The national certificate and diploma courses in business studies will continue substantially as they are for the foreseeable future, and the present nomenclature should therefore stay as it is, since the introduction of new titles would only lead to confusion. Should a review by a future BEC result in the emergence of new-style courses in business studies, attention would no doubt be given to the question of new-style titles to go with them.

Chapter IX — GENERAL CONSIDERATIONS AFFECTING TECHNICIAN AND COMPARABLE COURSES

Transition from School to Further Education

240. In paragraph 152 we referred to the need for effective arrangements for the transfer of potential technicians from school to further education, and to the importance of placing students in the right courses to begin with. The stages at which specific action is needed to ensure success in this connection are (i) the careers guidance stage (ii) the final stage of school education and (iii) the early stages of the further education itself. The first and second of these stages do not necessarily come in the order in which we have set them out, and indeed in most cases they may overlap with one another.

241. It seems to us of critical importance that pupils judged to be of future technician calibre should be well-informed while they are still at school about the wide range of job opportunities open to them when they leave. This means of course that if those who guide them are to do their jobs effectively, they must have a knowledge of the general range of technician and comparable occupations in industry and business, and the educational standard required for entry to these occupations at the various levels. A most essential part of this knowledge must be familiarity with the relevant part of the further education system. As we described in paragraph 124, the position in this respect appears to be far from satisfactory at present, and more must be done to ensure that pupils of the requisite standard base their choice of course on, among other things, correct and up-to-date information about the opportunities for training and associated further education which go with the various jobs. We appreciate that many efforts are at present being made in this direction by the education departments, local education authorities, colleges, the youth employment service and other appropriate agencies. These efforts stem in no small measure from the recommendations of the Alexander Report* on "The Public Relations of Further Education". We would draw the renewed attention of all concerned to the emphasis placed in that report on the importance of improving public understanding and knowledge of the facilities offered in the further education system, and to the detailed advice it offered on the steps to be taken to achieve that end. It may now be opportune to review the effectiveness of the arrangements made at national, regional, local authority and college levels following the report, and to take steps to reinforce these where required. We would also regard it as an important part of the task of the TEC and BEC to augment the public relations efforts of education and industry by disseminating details of courses and qualifications available at the technician and comparable levels. Since the advice of a youth employment officer is often crucial at this stage of a young person's career, we would expect the Councils to make appropriate arrangements, through the Central Youth Employment Executive, to ensure that these officers are kept fully abreast of the latest developments in this level of further education.

242. With regard to the final stage of school education, it is not of course any part of our task to advise on the content of this or the form it might take. Nevertheless, with the proposed raising of the school leaving age, the associated possibility that some pupils might spend their final year of compulsory education

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*"The Public Relations of Further Education": A Report by a Sub-committee of the National Advisory Council on Education for Industry and Commerce. (DES, 1964).

at a college rather than a school, and the growing tendency among young people generally to stay longer in full-time education, there are clearly going to be many opportunities for co-operation between the schools and colleges in preparing young persons for technician and comparable jobs when they leave school. We therefore recommend that the TEC and BEC should carry out joint studies with the Schools Council to devise suitable courses for these young people, who seem likely to form an increasing source of recruitment into the technician grades in industry and commerce. For similar reasons we consider that the TEC and BEC should bear in mind the desirability of having representation from the secondary schools on committees concerned with the earlier stages of technician courses. We would see much scope for fruitful collaboration between schools and colleges in the field of courses for young persons who remain in full-time education beyond the compulsory period without necessarily having one of the traditional forms of higher education in view. The courses provided for such pupils during this transition stage from school to further education need just as much careful thought and preparation as that currently devoted to courses for sixth formers en route to the university.

243. We have already referred to the diagnostic function embodied in the Technician Certificate stage of the new pattern of courses we recommend for technicians in the technical sector, and to the orientation course that will be available where needed for 18-year-old school leavers who enter the pattern at the higher technician stage. We have also suggested that the BEC should give consideration to the need for a diagnostic process for younger entrants to courses of further education in the business sector. Dispositions of this kind in the early stages of further education and the steps we have indicated above in regard to information and pre-technician education, should do much to ease selection problems and help to ensure that the students are placed on courses which are neither beneath nor beyond their true capabilities. Equally important is that employers should, as far as possible, select young people for jobs which are commensurate with their abilities. In this way both employer and employee will reap the full benefit of an appropriate educational course.

Bridging Between Courses

244. Irrespective of how effective the initial selection procedures become, however, it is inevitable that some students will continue to find that the course they are following is not the right one, and that they should be on one which is more or less demanding as the case may be. It is important that the patterns of technician and comparable courses should recognise this, and that they should include at appropriate points opportunities for such students to change to other courses more suited to their aptitudes and abilities. The new course pattern we recommend for the technical sector would of itself make transfers of this kind somewhat easier than they appear to be now, and in developing course curricula and syllabuses the TEC and BEC would no doubt be at pains to avoid the creation of artificial barriers between different areas of study. There will still, however, be a need at certain points for "bridging" tuition to help bring transferring students into line with their fellows on the new courses.

245. The timing of such transfers is of critical importance especially where transfer to a more demanding course is concerned. In the early stages of practically any course it is possible for a student who shows the necessary promise

to transfer to a more demanding one without the benefit of a special bridging course. The "point of no return" in this connection varies from course to course. When this point has been passed—and although this is a matter for judgment in the individual case by the student, his teachers and his employer, in our view it is usually a matter of weeks rather than months—the student would be well advised to complete the original course, or an appropriate stage of it, before he transferred to the new course. It is at the point of transfer that he would usually require bridging tuition, which might take the form of extra study to be undertaken concurrently with the new course, or be a separate course to be undertaken before the new course, or in some cases even at the same time.

246. Two points arise on this kind of bridging course. First, the numbers attending any particular course of this kind are bound to be small, so that they will have to be treated sympathetically under the criteria for the approval of courses if they are to run at all. Second, the students will often need to put in extra study; indeed, for some the bridging process might be tantamount to doing two courses at once, at least for a period of time. We hope that employers will look favourably on requests for extra release time, and that ITBs will encourage this by making correspondingly generous grant arrangements to cover such circumstances.

247. We do not wish to offer specific advice to the TEC and BEC on detailed aspects of bridging courses such as form and duration. So much depends on the needs of particular students and the pattern of study available to them and these courses may in practice turn out to be almost *ad hoc* in character. In fact, the "student-centred" approach to analysing and meeting bridging needs, which we would hope to see widely adopted, would probably show that "courses" in the normal sense were unnecessary in the majority of cases, and that the students would derive the best and quickest results by following personal programmes of study designed to meet their individual needs. In such cases we would expect maximum use to be made of student reading programmes coupled with tutorial assistance, and of modern teaching aids such as various forms of programmed learning, so that the individual student could make the speediest progress in the time available to him. While we would hope to see bridging programmes provided at the right points for the right people at all technician and comparable levels, we would particularly wish to see them continue to be provided in appropriate cases for higher technician students who wish to transfer to degree courses.

Student Assessment

248. In paragraph 132 we set out the various forms of examination mentioned in the evidence we had. There are no doubt other techniques with valid application to the assessment of a technician student's performance in his course of further education. Because the field with which we have been concerned covers such a wide variety of courses, subjects, standards and students, we have concluded that it is not possible to make a recommendation about an optimum method of assessing technician and comparable students. Nor do we feel that we are in a position to suggest that any particular combination of techniques is right for all circumstances in the technician field. It would be for the TEC and BEC to decide in the circumstances of each course the kind of component or combination of components that should be used to test the students.

249. We feel, however, that we should set down a number of general principles concerning the assessment of students to which the Councils might have regard in deciding their own approach to the question. In the first place, we are strongly of the opinion that any student who fulfils the entry requirements for his particular technician course, and works reasonably hard and well during the course, should be entitled to expect that he will pass the examination.

250. The award of a technician or comparable qualification, whatever the level, should never depend solely on the student's performance in a formal examination. We think the time has come to move away from the present rather extensive dependence on formal examining as the main or only measure of a student's performance on a technician course. As we have said above, there is no single combination of examining techniques which can be said with certainty to be universally applicable, but we would assume that some sort of formal test, externally set or assessed, would continue to feature in all cases. It should not, however, be accorded the same degree of importance as in the past.

251. The number of externally set or assessed examinations to be taken during a course should be kept to the absolute minimum. Normally there is no reason why there need be more than one for each self-contained stage of the course. We deplore the use of external examinations at non-terminal points in technician courses, and would like to see colleges which follow this practice put an end to it forthwith. In any event, we trust that the TEC and BEC would give no encouragement to any such practice when they began their operations.

252. The measurement of performance on the educational course, whatever the particular form it takes, is only one part of the total assessment of the trainee's progress towards full preparation for his job. The other and equally important part is the measurement of his progress on the job itself. We would hope to see the TEC and BEC collaborate with the ITBs or other appropriate interest on methods of arriving at an overall educational and practical assessment of the trainee. In cases where it was possible to achieve this satisfactorily, both the educational and industrial interests should be associated with the award of the qualification to the student.

253. Both Councils should be ready to encourage the use of different combinations of assessment techniques for technician and comparable students; and in particular to encourage the use of techniques which involve the students' teachers at all stages, and external examiners and assessors at various points during the course as well as at the formal examination stage.

254. Finally, the Councils might consider in appropriate cases basing the grant of technician and comparable qualifications on studies undertaken under the "credit" system, i.e. the gradual accumulation of passes in subjects which have been studied separately and not as one of several forming a grouped course. As noted in paragraph 32, some end-on T courses are at present organised on this basis by CGLI. We are unable to say whether significantly increased numbers of students would in fact undertake some part of their further education in this way, but the introduction of the modular concept of training and education, and the increasing tendency for adult workers to return to the education system for periods of re-training during their working life, open out possibilities in this direction. We would not, however, see the "credit" system extend down into the first stage of technician education. In our view the education at this stage should always take the form of a grouped course.

Duration and Form of Courses

255. The overall duration of technician and comparable courses, with what is basically a two-year stage between one level of qualification and another, is about right, and we do not recommend that there be any general change in this. This does not mean, however, that we regard two year courses or stages as sacrosanct, and the TEC and BEC would no doubt make exceptions to this general pattern as might seem fitting to them in particular cases especially in the light of future developments in training and teaching methods. In general, however, we would support the view that if initial technician education were compressed into too short a span, there would be some danger of its effectiveness being reduced because the students would not in such circumstances be able to obtain adequate matching industrial or other practical experience.

256. The most appropriate arrangement of study will vary from case to case, depending on the nature of the course concerned, the needs and the background of the students, the associated training programme, and the amount of release time given. As we see it, the part-time day course is likely in practice to continue in the immediate future to be the most popular arrangement although, as we point out in paragraph 261, there are indications that a bare one day a week is insufficient to cover the reasonable further education requirements of an increasing number of technician trainees. Under the stimulus of the Industrial Training Act, it should from now on be possible to achieve a large increase in the number on block release and sandwich courses for technicians.

257. We are aware that block release courses are sometimes unattractive to younger students and their parents where they involve living away from home. They cause difficulties of organisation for some employers and colleges. The additional time they make available can give rise to the temptation to add to the syllabus more subject matter than is strictly necessary for the proper aims and function of the course. It is sometimes difficult to maintain the habit of study, especially with the less academically-inclined students, unless the intervals between the blocks are relatively short, or some continuity of contact between students and teachers can be maintained between blocks.

258. We are in no doubt, however, that release for periods of full-time study for technicians, through the block or sandwich system, has important educational advantages over part-time day release. In fact, when discussing the further education of technicians, the Crowther Report said that the part-time system could not be made a satisfactory one for "these key men in the community". The Report went on to say that, while much would naturally be gained by increasing the time available on part-time day courses (by adding to the length of the college day and the college year) and by increasing the incidence of block release courses, there would still be too much for the technician student to do in too short a time. The Report therefore concluded that the sandwich course should be regarded as the standard and only satisfactory method for educating technicians. It acknowledged that it would be a long time before the part-time route could be abandoned without endangering the supply of technicians but advocated maximum efforts to popularise the sandwich form of course for them. We would therefore like to see further and faster development of sandwich courses for technicians, especially for those studying for technician diplomas under the new arrangements, and we would hope to see the TEC and BEC, actively encouraged by the ITBs, give a sharp impetus to such a development.

259. Concurrently with this, and as an additional step along the road to a full pattern of sandwich courses, we should like to see many more block release courses for technicians of all kinds, with blocks of a length that would provide a good deal more time for study than is possible under the part-time day system. Most of the drawbacks referred to in paragraph 257 could be overcome by better organisation and more intensive use of the available educational and training facilities for technicians. We do not wish to embark on discussions of questions concerning the length of the college year, which is in any case the subject of current consideration by another committee of the National Advisory Council. We feel we should, however, make the point that industry and commerce are not likely to respond to appeals to grant more block release to more technician students unless college facilities are made available for a longer period of the year than is generally the case at present.

260. Another technician training arrangement which the Councils and the boards might with benefit encourage is the integrated course of combined further education and practical training. At present a number of technician trainees, chiefly under the aegis of the Engineering ITB, follow courses of this kind in technical colleges, where they combine the first year of their educational course with the first year basic training programme laid down for them by the Board. It seems to us that there may be scope in certain cases for an extension of this practice into parts of the second and subsequent years of training, especially where firms experience difficulty in providing adequate facilities of their own for some of the areas of "general training" recommended by the Board for technician engineers. In principle, we see no reason why in such cases the appropriate parts of the "general training" and relevant blocks of associated further education should not be integrated to form a single course, which need not, of course, be a year or anything like a year in length.

Time for Study

261. Whatever the arrangement of a technician or comparable course in any particular case, it is really essential that the time specified for coverage of the syllabus should be adequate in relation to the pace of the average student. The Crowther Committee said, in relation to the need for time on courses of further education—"If we were confined to one comment and one recommendation about English further education, it would be this. At every stage, and on every level, the need is for more time, for less pressure on staff and students. Even a little more time would, in our opinion, much more than proportionately raise the educational yield. Some courses . . . . cannot be done properly in less than half the student's time and all of them could be made much more rewarding if every minute did not have to be so jealously preserved for the immediate task of covering the syllabus for a set examination". The need for more time is no less today than it was ten years ago, especially on courses for technicians. On the contrary, developments since then have strengthened the case for more time for study than can be encompassed in the system of release on one day a week, especially for technician students following science and technology-based courses. Hence our strong plea for the adoption on a much wider scale of sandwich and block release arrangements.

262. While we would expect the TEC and BEC to resist all moves to overload the syllabus unnecessarily, it must nevertheless cover not only the relevant

fundamentals of the subject at a suitable level, but also a reasonable modicum of job-orientated as well as general studies (see paragraphs 268-270). In our view it is not possible to lay down a given number of hours of study which would be appropriate for all technician courses, because clearly the requirement for different subjects at different levels is likely to vary. Having devised or approved a particular syllabus, the responsible Council would indicate the minimum amount of time needed to cover it adequately, and we would assume that training boards and other responsible organisations in industry and commerce would then encourage individual employers to grant at least this amount of release time. The form that the release would take for a particular course could be left to the college offering the course and the employers using it to decide in the light of (i) what we say above about an increased emphasis on sandwich and block release arrangements; (ii) any special recommendation by the appropriate ITBs; and (iii) any special local circumstances.

263. In making these suggestions about the duration and form of courses, and the amount of time for study, we have not overlooked the fact that many technician and comparable trainees do not get any release at all from their work to follow further education associated with their training. We have been particularly concerned that the proportion of technician-comparable employees being released in the business sector (in which we include the commercial departments of industrial undertakings) is so very low. In paragraph 178 we pointed out that the BEC would have an important task to perform in bringing about a change in this situation. We do not, however, think that the efforts of such a Council alone would be sufficient in this respect. There must be a wider realisation amongst all employers that it is vital, not only to the interests of the trainees, but to their own interests and to those of the country as a whole, that all technician and comparable personnel under training should be given adequate release during working hours to take appropriate further education. We realise that good progress has been made in some sectors, but in others progress is too little and too slow, and it may well be that in such sectors the completely voluntary approach to the grant of release is insufficient to achieve the results we think essential. The Secretary of State for Education and Science has referred to the intention to prepare a new Education Bill which will not only consolidate current legislation but introduce a number of specific reforms. We recommend that consideration should be given in the preparation of the new Bill to the possibility of including within it a measure to confer on every technician and comparable trainee a right to appropriate release from work to follow a course of further education associated with the training for his occupation. In advance of the introduction of such a measure, we urge the ITBs and all other organisations with an interest in this matter, including representative organisations of employers, to use their maximum influence to persuade employers to increase the grant of release for further education on a voluntary basis. In particular, we urge the ITBs to make positive efforts to encourage employers of technician and comparable trainees at present obliged to follow evening courses to release them to day courses as quickly as possible. In our view—and this was supported by the evidence we received—evening classes are not suitable for technician and comparable courses leading to recognised qualifications.

Course Arrangements in Other Countries

264. We examined the methods by which some other countries organise

education and training courses for their technicians. A brief account of some of the practices we studied in this connection is given in Appendix No. 8. We asked ourselves if there were ways in which the undoubted advantages of our own system, with its firm industry/college links, could be improved by adopting any of the features of the continental and other systems concerned.

265. In our view the time when the industrial link is least important, and also when it is hardest for industry to cater for trainees, is the first year. This is the time for the acquisition of the basic skills necessary for the various technician occupations. We think that these may be acquired as well—and possibly better—in a college as in a job situation, and we see much virtue in the Engineering ITB's concept, referred to in paragraph 260, of a common first year of off-the-job training, particularly when this is carried out as part of an integrated course in a college. For most technician occupations, however, one year of training away from the job situation is as much as is desirable. Thereafter the training should be carried out as a planned scheme within industry, with associated further education in college, both elements of the programme having been planned together.

266. There may be some areas of technician activity where longer periods of full-time integrated education and training in colleges would be desirable. Television servicing is a possible example. Our view is, however, that at least one year of training should take place in the work situation, whatever the occupation concerned. This might well be sandwiched between periods of full-time attendance at college. The exact arrangement would be a matter for joint planning between the education service and the appropriate ITB. This would make the best of both worlds, and would have the advantage of providing, through the full-time integrated college course at the start of the training programme, a suitable programme for the transition from the school environment on the one hand to the industrial or business environment on the other.

267. Some past and present members of the Commonwealth are operating courses for technicians which culminate in examinations set by bodies in the United Kingdom. Should our recommendations be accepted, the relevant authorities in such countries would no doubt wish to consider their position when new arrangements became effective in this country. In any case where an overseas country decided to adjust its own arrangements for technician courses and examinations to conform to the new pattern, we would hope that the TEC and BEC would be prepared to offer whatever advice and facilities were appropriate to make this possible.

General Studies in Technician Courses

268. The primary aim of technician education is vocational. The results of the education should, however, be judged not merely on the technical accomplishment of the student but also on how it has contributed to his general personal development. All technician and comparable courses include a period of time, additional to that allocated for the main vocational studies, for general studies. These are designed to encourage a broadening of the student's attitude to his occupation and environment, to heighten his sense of responsibility, independence of thought and ability to communicate, and in general to influence the effectiveness with which he does his work. We are in no doubt that time spent on a reasonable and relevant programme of general studies is time well spent

however difficult it may be to assess the precise results, and we recommend that all syllabuses for technician and comparable courses should continue to prescribe these studies as an integral part of the course.

269. We are, of course, aware that there is criticism of the quality and appropriateness of some general studies, and of the feeling among some employers that the time used for general studies would be better spent on more technical education. In an area of study where conviction, situation and experience may well vary from one locality to another, and which is still the subject of much experiment and innovation, this is cause neither for surprise nor alarm. Considerable mutual understanding and collaboration are needed from both employers and teachers in interpreting, and devising the best ways of meeting, the needs of students in a field in which it is not possible to define with clarity and certainty the purpose, form and content of the studies. General studies can be interpreted widely to cover whole fields of cultural and social studies, or they can be related closely to the vocational subjects, or be a blend of both. In our view, each college should remain free to plan these additional studies and activities in support of the main vocational studies, and link them closely in purpose and method in the way best suited to local needs and circumstances. Given such freedom on the part of the colleges, there can be no question of general studies being examinable in the formal sense, although we would imagine that some method of college assessment of the contribution of individual students could no doubt be devised if the students, the teachers and the employers agreed that this was desirable.

270. In the field of technician and comparable education, general studies can play a particularly valuable part in reinforcing the efforts made during the vocational studies to develop in the future technician the communication skills which are going to be so important to him in his future career. They should also be of real benefit in preparing him for the supervisory role he will almost certainly be called upon to undertake in the course of his career.

Correspondence Courses for Technicians

271. We believe that for a fully adequate technician or comparable education there is no effective substitute for the live classroom, laboratory and workshop tuition and guided study embodied in a proper course of further education taken by attendance at a college. We have, however, considered whether the use of correspondence courses should be recommended for those who are unable for one reason or another to take a college course in the normal way. The kind of trainees we have in mind are those, including members of the armed forces, who live and work in places remote from colleges; those who are on shift work which makes attendance at a college difficult or impossible; and mature students who are not given day or other release, and whose family circumstances are such that it is not possible for them to attend a college in the evening.

272. There may be circumstances in which a correspondence course by itself would meet the full educational needs of a technology-based technician student, but having regard to the workshop and laboratory studies incorporated in the normal technician course, such circumstances would be unusual. There is, however, more scope for correspondence courses in the business sector, where workshops and laboratories are not normally needed, and here they no doubt meet a need where it is quite impossible for the student to attend a normal

course of further education. We do not necessarily accept that all students living and working in remote areas should thereby automatically have to forgo the benefit of a college course, because block release and sandwich courses can and often do meet their needs. Given that there are students who would otherwise find themselves without tuition, however, we would accept that correspondence courses have a part to play in the provision of technician and comparable education. They may, for example, provide a suitable means for students to acquire additional theoretical knowledge to enable them to "bridge" from one course to another.

273. We would, however, recommend that some form of occasional personal attendance and, where appropriate, practical tuition should be an essential feature of such courses, whether they are correspondence courses of the traditional type conducted by private bodies or programmes of directed study on the lines of those being operated by a number of colleges of further education. How such seminars, tutorials, lectures and practical work might best be organised would depend on the particular case, but in any event we would hope that the TEC and BEC would satisfy themselves that they had in fact been arranged as appropriate to the case before allowing the students concerned to take examinations leading to their qualifications.

274. It might be appropriate for the Councils to establish links with correspondence college organisations and other bodies already experienced or—for example the Open University—developing experience in making such arrangements. In due course it might be decided that the possibilities of combining postal and live tuition on a more extended scale could be explored through a study by the National Council for Educational Technology. In this connection, as well as generally, the TEC and BEC would no doubt also keep in mind the extensive current developments in educational broadcasting.

275. Technician and comparable students following correspondence courses should not be expected to do so entirely in their own time, as appears so often to be the case at present. Their employers, encouraged where appropriate by ITBs, should grant them study release with pay from their normal work to undertake the course, and any tutorial or similar visits which have to be made in connection with it. The duration of this study release should generally be in consonance with that which the student would have been granted to attend a normal further education course by day or other form of release had one been available.

Further Training and Conversion Courses for Mature Trainees

276. In paragraph 67 we referred to the developing concept of training as a continuous process, beginning with a rather shorter period of initial training than hitherto thought necessary, but envisaging further training and education at later stages where this was shown to be necessary. It would fall to the TEC and BEC to stimulate provision for suitable courses for more mature persons who required either to be up-dated in their own field, or to be trained in a new one.

277. We imagine that the up-dating courses would in general attract broadly homogeneous groups of the more mature trainees. They would normally be devised and provided by colleges on an *ad hoc* basis in collaboration with local employers and representatives of ITBs or other appropriate interests in much the same way as is done at present over a wide range of subjects, with the Councils providing a performance assessment service as required.

278. Courses of further training and education to adapt an experienced craftsman to a technician grade of work, or a technician experienced in one field to work in another, might present a number of problems. Because of the trainees' different backgrounds, motivations, rates of learning and ability to communicate, these courses would require the most careful preparation, and the syllabus and teaching approach used on them would probably have to be very different from those devised for younger students. On the whole, therefore, we would expect to see the more mature trainees follow their own specially-devised "conversion" courses. For some, however, it might be appropriate for them to join with younger students on the "module" of education relevant to their new field. In these cases there might be a need for some special "bridging" tuition to prepare the older trainees for entry to the module, as it could not be assumed that they would in every case have had adequate previous education in the subjects on which the module was based. It might also be necessary to make special provision to run classes for mature students in the evening, although we would hope that such courses would be exceptional, and that employers, encouraged by their ITBs, would be prepared to give mature trainees full release, facilities to undertake a day, block or short full-time course in their new field.

NOTE OF DISSENT

By Mr. W. F. Crick

Reluctantly, I feel bound to record my dissent from the recommendation in paragraph 189 as it relates to the proposed Business Education Council. This divergence from the judgement of my colleagues springs in part from the fact that I regard as premature any expression of opinion (paragraphs 164 and 181) at this stage as to the balance of advantage and disadvantage likely to result from an ultimate merger of the two Councils into one. For my part, the desirability of a single Council, covering the whole range of education at technician level, is and must remain for some time an open question the answer to which must be sought in the light of experience yet to come and evolving needs the pattern of which cannot at present be foreseen. I see no presumptive and commanding virtue in an all-inclusive body—or, indeed, "a unified system of examinations and assessment" (paragraph 205). Consequently, the idea that a common support structure would serve the attainment of these ends carries no weight with me; nor do I accept the assertion (paragraph 183) that it would, without question, strengthen the "consultative links" between the two Councils.

More directly, there are in my view grave objections—even allowing for "safeguards"—to calling upon the CGLI to provide for "all servicing and other administrative needs" of the BEC (paragraph 191). It is understating the position to suggest that the Committee's proposal "applies with much greater force to the TEC than to the BEC", in whose hemisphere of interest it is indeed "something of an unknown quantity" (paragraph 190). Hitherto the Institute's activities in the "non-technical" sectors have been minimal—almost negligible—and it would be no easier, to say the least, for the CGLI to make its way into the "business" area than to set up a separate administrative organ, headed by people carefully selected for their commercial background and knowledge of educational conditions and examination systems in the field. The fact that the CGLI is so little known in the business world is hardly encouraging to hopes for its success, at administrative level, in the processes of tactful approach and constructive persuasion which would form a critical part of the work of the BEC.

The BEC is to deal with a range of tasks broader than and in part different from that of the TEC (paragraphs 174-5 and 177-180). The order of urgency of these tasks will put some non-examinational concerns—the broadening of exemption from professional examinations (paragraph 232 et seq) and the extension of release practices (paragraph 178), for instance—in the forefront, especially in the years immediately ahead. For the work that will fall to the BEC the vast experience of the CGLI in examination techniques is of doubtful advantage; it might even divert attention from the more immediately important tasks in business education.

Recalling observation over many years of the course of development in education for commerce and industry, there appears to me to be a very real danger in the proposal put forward by my colleagues—the danger of so far over-stretching the resources of the CGLI, with its almost wholly industrial ethos, that they will in practice be allocated to the detriment of much needed, overdue progress in the field of business education. And problems of allocation of resources are thus just as likely to set up friction between the Councils as to further the strengthening of "consultative and operational links" (paragraph 190) between them.

My misgivings are all the greater because of a fact of life which, let me make clear, is stated without implying any singular criticism whatsoever of the CGLI. There seems to be a general tendency, in public affairs, for "the administration" to exert a strong, perhaps still growing, influence upon policy formation within the body it serves. It has not been made clear, in evidence, just where responsibility for policy formation lies within the structure of the CGLI; nor have we been able to examine the actual working relations between the Council thereof, the two major Committees and the administration. There is, further, no assurance that changes could and would be made within the organisation—and they would need to be substantial and speedy—to provide for adequate representation of "business" as distinct from "technical" interests.

This situation adds weight to the possibility that CGLI officers (whether already established or to be specially recruited) who were allocated to the BEC would be placed in peril of divided loyalty, on the one hand to the Council they were directed to serve and on the other to their employing body with its sub-conscious "industrial" approach to examinational and (fully as important in the hemisphere of the BEC) non-examinational problems. There are here again the seeds of an inherent risk that urgent tasks in the commerce field would not be tackled with the single-minded energy they require or with the knowledge and understanding that only a specially selected, separate staff, working under the undivided authority and direction of a strong BEC, could supply.

Briefly stated, then, these are among the considerations compelling my dissent. Reason and instinct based on past observation offer me no escape from the view that what is needed is not only a separate Council, but also a separate and special (though quite small) administrative organ to carry out, on its behalf, the functions indicated in paragraphs 177-180. Only so can the hope be nurtured that education for commerce will be driven forward to match the needs of the time and be brought up to the standards already set on the industrial side of our national system of technical education.

SUMMARY OF CONCLUSIONS AND RECOMMENDATIONS

Chapter VI — SUITABILITY OF THE PRESENT PATTERN

1. The present pattern of technician courses and examinations is unsuitable in a number of important respects as an instrument for meeting not only existing needs, but also the new and changing needs likely to arise in the coming years. In particular, the present administrative machinery will not be adequate to deal effectively and economically with likely future demands. There must be adequate and co-ordinated arrangements for ensuring that technician and comparable courses and examinations of a national character are brought into being and kept up-to-date to match the changing requirements of industry and commerce. (paragraphs 149-158)

Chapter VII — FUTURE ADMINISTRATIVE AND CO-ORDINATING MACHINERY

2. Comparatively minor modifications might meet some of the criticisms expressed about the existing separate parts of the administrative system, but they would still remain parts and remain essentially separate, when what is needed is a major move towards unification. A start should be made to drawing together under one body for each of the two main sectors, technical and business, responsibility for planning, co-ordinating and administering technician and comparable courses, examinations and educational qualifications of a national character. To this end the Secretary of State for Education and Science should set up as soon as possible a Technician Education Council (TEC) and a Business Education Council (BEC). (paragraphs 159-165)

TECHNICIAN EDUCATION COUNCIL

3. The TEC should be responsible for developing a unified national pattern of technician courses in the technical sector. It should be a relatively small policy-making and co-ordinating body of 15-20 persons drawn from the education service, industry and the technician and professional bodies. Members should be appointed by the Secretary of State in a personal capacity, after due consultation with relevant interests in education and industry. The TEC should comprise some two-thirds "education" members and one-third "other" members. As soon as possible after its appointment it should assume policy and planning responsibility for examinations and qualifications in the whole of the technician field at present covered by joint committees, CGLI and the REBs. (paragraphs 166-168)

4. An early task for the TEC would be to accept transfer from the DES of the administrative work at present carried out by the Department in connection with certain national certificate and diploma courses and examinations. It would not be possible to lay down any order in which responsibility for other courses and examinations would be transferred, or to suggest a time scale within which the whole operation should be completed, and the assumption by the TEC of overall responsibility for all technician courses and examinations would require to be phased over a period, possibly lasting a number of years. (paragraphs 169-172)

BUSINESS EDUCATION COUNCIL

5. The BEC should be responsible for developing a unified national pattern of courses in the field of business and office studies at levels below that of first degree. Its responsibility should not, however, extend to "office skills" courses and qualifications. It should be a relatively small body drawn from persons of standing in the education service, the business world and industry. The number of members, the method of appointing them, and the proportion of "education" to "other" members should broadly follow the lines recommended for the TEC. (paragraphs 173-176)

6. The task of the BEC would differ in some respects from that foreseen for the TEC. While its function of administering courses and awarding qualifications would be on a smaller scale, its course-promoting and co-ordinating functions would be relatively greater. It would be an important function of the BEC to convince employers in all sectors of the business, professional and commercial community of the importance and value of releasing the trainees to attend courses of further education. As soon as possible after its appointment it would assume responsibility for national certificates and diplomas in business and associated studies, including the certificates in office studies. In the longer term the BEC would consider the development of a full pattern of courses, examinations and qualifications in business and office studies.
(paragraphs 177-180)

CONSULTATION BETWEEN THE COUNCILS

7. The two Councils would be expected to forge strong consultative and operational links with each other, and to establish a standing consultative committee to keep matters of common interest under consideration. The TEC should be responsible for courses for the hotel and catering and transport industries, while the BEC should be responsible for courses for the distributive trades. Responsibility for computer courses might have to be shared by the two Councils, with policy and planning based on advice from their standing consultative committee, which would also determine which Council should be responsible for the further education in other "mixed" sectors.
(paragraphs 181-186)

ADMINISTRATIVE ORGANISATION OF THE COUNCILS

8. The City and Guilds of London Institute should be invited to undertake the administrative work of both the TEC and the BEC. (See Note of Dissent by Mr W. F. Crick). Under this proposal, the two Councils would be independent bodies responsible for the making and directing of policy in their respective fields, with each drawing on the resources of the CGLI for all servicing and other administrative needs. A number of important practical issues would arise from this proposal, but, these could be examined when the project was nearer realisation in principle, and a more detailed assessment could be made of them and the best answers to them. (paragraphs 187-192)

FINANCING THE COUNCILS

9. The administration of technician examinations is financed mainly from income accruing to the various administering bodies from examination fees.

There would be no reason to depart from this general principle in the case of the examinations for which the TEC and the BEC would become responsible. The present application of the principle appears wasteful, however, and it would be simpler and cheaper for lump sum payments to be made to the new Councils in respect of fees for assessing students on courses leading to their qualifications. This would enable the Councils to concentrate wholly on educational objectives and, by permitting the development of a much more flexible system of assessment, lead ultimately to greater productivity in the technical education system. Local education authorities should be invited to collect a composite course fee, covering both tuition and examination elements, from students enrolling on courses leading to qualifications within the responsibility of TEC and BEC; and to pay each year to the two Councils a lump sum representing the total of the examination element of the course fees so collected. The Exchequer should also meet part of the Councils' costs, at least until such time as the scale of their operations assured them of a sufficient income from fees. (paragraphs 193-199)

A ROLE FOR THE REGIONS

10. It would be a most desirable development if the unified administrative system proposed were to include within its framework a substantial and positive role for regional examining organisations. Under such arrangements the planning of certain courses and the conduct of examinations could be operated from the regional organisations subject to policy directions by the Councils; for other courses and examinations the work could be undertaken partly at the centre and partly in the regions. This would reduce the delays frequently characteristic of an over-centralised system. While the regional support structure should be based on existing bodies if possible, the new unified system could not accommodate regional organisations carrying out separate and independent external examining functions of the kind the REBs provide at present. Integrated with the administrative support structure of the TEC and BEC, however, the REBs might form the nucleus of a pattern of regional examining organisations. As a preliminary step towards this, the CGLI and the REBs should consider extending the co-operation at present undertaken within the CTEB, and drawing closer together to form a unified administrative organisation for the examination, testing and general assessment of performance. In considering any arrangements for a re-organisation of the existing regional examination system, consideration should also be given to whether and how the regional advisory councils might be involved. (paragraphs 200-205)

Chapter VIII — FUTURE PATTERN OF COURSES

GENERAL

11. The new Councils should bear in mind the need for courses designed to produce technicians and their business counterparts capable of readily adapting themselves to changing circumstances; devise effective arrangements for keeping the subject matter and structure of courses under review; give early attention to reducing the multiplicity of individual subject courses that exist at present; and take steps to secure suitable representation from the training board and other appropriate industrial and commercial organisations on their advisory committees. (paragraphs 208-212)

THE TECHNICAL SECTOR

12. The TEC should gradually establish a new general pattern of technician courses better suited to modern needs. The first step in this direction should be taken in the field of engineering, and the pattern should be extended at appropriate junctures to other technical fields until it becomes the normal pattern of technician education for the technical sector. The timing of its introduction would vary from one industry to another, and a substantial period might be needed before it becomes established as the universal pattern. To minimise the possibility of confusion on nomenclature the TEC should make it clear that new titles referred exclusively to new style courses and qualifications. (paragraphs 213-220)

13. G courses should be phased out after 1972/3, subject to suitable transition arrangements for students already taking the course. In fields of study where the new pattern of technician education is not in operation by then, students who would in other circumstances have entered a G course should instead enter the first year of a reconstituted T course. (paragraphs 221-223)

14. The HND should be retained in the technical sector until the new HTD becomes established, and it is possible (i) to make certain dispositions about transfers from the HTD to degree courses, and (ii) obtain for the HTD a similar measure of professional recognition as is now accorded to the HND. It would be for the TEC to take whatever action was necessary in this connection, and to judge in each subject area when the HND should be brought to an end. (paragraphs 224-228)

THE BUSINESS SECTOR

15. No general change is recommended in the present pattern of national certificate and diploma courses in business studies, nor in the length of the individual courses. It is foreseen, however, that the BEC would wish to take an early opportunity of reviewing all aspects of these and other courses of a national character in business and office studies. There are indications that the two year full-time HND course may not fully meet the needs of some of the highly-qualified students who follow it. Consideration might be given to developing the HND in business studies exclusively as a three-year sandwich course, and to the promotion of a further increase in the number of places on degree courses in business studies. (paragraphs 229-231)

16. Despite satisfactory progress made in matching ONC/D courses to professional requirements in the business field, there is still a long way to go before the possibilities in this direction can be said to be exhausted. The possibility of professional exemptions in respect of HNC/D do not appear to have been exploited to any significant degree. The BEC should investigate these with the leading professional institutions in commerce. Professional and similar associations whose academic requirements for membership can be met by something less than first degree should state their requirements in terms of the national technician-comparable qualifications provided. (paragraphs 232-236)

17. As part of its examination of the general position, the BEC should consider the need for a diagnostic course at the pre-ONC stage, and for a progression of secretarial courses at technician-comparable level. (paragraphs 237-238)

18. The nomenclature of courses and qualifications in business studies should not be changed at present. Should a review by the BEC result in the emergence of new-style courses and qualifications in this field, there would no doubt be new-style titles to go with them. (paragraph 239)

Chapter IX—GENERAL CONSIDERATIONS AFFECTING TECHNICIAN AND COMPARABLE COURSES

TRANSITION FROM SCHOOL TO FURTHER EDUCATION

19. It is of critical importance that pupils judged to be of future technician calibre should be well informed while they are still at school about the wide range of opportunities open to them when they leave. Renewed attention is drawn to the emphasis placed in the Alexander Report on "The Public Relations of Further Education" on the importance of improving public understanding and knowledge of the facilities offered in the further education system. It may now be opportune to review the effectiveness of the arrangements made at national, regional, local authority and college levels following the Alexander Report, and to take steps to reinforce these where required. The TEC and BEC should carry out joint studies with the Schools Council to devise suitable courses for young persons who remain in full-time education beyond the compulsory period, particularly for those who do not necessarily have one of the traditional forms of higher education in view. (paragraphs 240-243)

BRIDGING BETWEEN COURSES

20. Even with better selection and a more feasible pattern of courses, there will still be a need at certain points for "bridging" studies for some students. Where formal courses have to be provided for this purpose, they will require sympathetic treatment under the criteria for the approval of courses. Industrial training boards should encourage the grant of additional release time for students who are required to undertake extra bridging studies. Bridging programmes should be readily available for higher technician students who wish to transfer to degree courses. (paragraphs 244-247)

STUDENT ASSESSMENT

21. It would be for the TEC and BEC to decide in the circumstances of each course the kind of assessment component or combination of components that should be used to test the students. The principle should be that any student who fulfils the entry requirements for his course and works reasonably hard and well should be entitled to expect that he will pass the examination. The award of a technician qualification should never depend solely on the student's performance in a formal examination, the number of which should be kept to the absolute minimum. The measurement of performance on the educational course is only one part of the total assessment of the trainee's progress towards full preparation for his job. The two Councils should be ready to encourage the use of different combinations of assessment techniques for technician and comparable students, and should consider in appropriate cases the award of qualifications for studies taken under the "credit" system. (paragraphs 248-254)

DURATION AND FORM OF COURSES

22. The overall duration of technician and comparable courses, with what is basically a two year stage between one level of qualification and another, is

about right. There should not, therefore, be any general change in this respect, but the TEC and BEC should make exceptions to this general pattern as might seem fitting to them in particular cases. The TEC and BEC actively encouraged by the industrial training boards, should give a sharp impetus to the development of sandwich courses for technicians. There should also be many more block-release courses for technicians of all kinds, with blocks of a length that would provide more time for study than is possible under the part-time day system. The Councils and the boards might also encourage more integrated courses for some technicians. (paragraphs 255-260)

TIME FOR STUDY

23. It is essential that the time specified for coverage of a syllabus should be adequate in relation to the pace of the average student. Developments in the past 10 years have strengthened the case for more time for study than can be encompassed in the system of release one day a week, but it is not possible to lay down a given number of hours of study which would be appropriate for all technician courses. The responsible Council should indicate the minimum of time needed to cover a syllabus adequately in any particular case, and the training boards should encourage individual employers to grant at least this amount of release time. (paragraphs 261-262)

24. Many technician and comparable trainees, especially in the business sector, do not get any release from their work to follow further education associated with their training. In such sectors the completely voluntary approach to the grant of release may be insufficient to achieve the results considered to be essential. The Secretary of State for Education and Science should therefore consider in preparing the new Education Bill the possibility of including within it a measure to confer on every technician and comparable trainee a right to appropriate release to follow a course of further education associated with the training for his occupation. (paragraph 263)

COURSE ARRANGEMENTS IN OTHER COUNTRIES

25. Experience in other countries indicates that the basic skills required by some technicians might be acquired as well in a college as in a job situation. For most technicians, however, one year of training away from the job is as much as is desirable. Even where longer periods of full-time integrated education and training are appropriate at least one year of training should take place on the job. Integrated programmes planned jointly between the education service and the appropriate industrial training boards, as in this country, seem to make the best of both worlds. (paragraphs 264-267)

GENERAL STUDIES IN TECHNICIAN COURSES

26. Time spent on a reasonable and relevant programme of general studies is time well spent, and all syllabuses for technician and comparable courses should continue to prescribe these studies as an integral part of the course. Each college should remain free to plan general studies in support of the main vocational studies, and link them closely in purpose and method in the way best suited to local needs and circumstances. General studies should be of benefit in preparing technicians for a supervisory role. (paragraphs 268-270)

CORRESPONDENCE COURSES FOR TECHNICIANS

27. For a fully adequate technician of comparable education there is no effective substitute for the live classroom, laboratory and workshop tuition and guided study embodied in a proper course of further education taken by attendance at a college. Given that there are students who would otherwise find themselves without tuition, however, correspondence courses have a part to play in the provision of technician and comparable education. Some form of occasional personal attendance, and, where appropriate, practical tuition should however, be an essential feature of such courses, and the TEC and BEC should satisfy themselves that suitable arrangements of this kind have been made before allowing correspondence students to take examinations leading to their qualifications. (paragraphs 271-274)

FURTHER TRAINING AND CONVERSION COURSES FOR MATURE TRAINEES

28. The TEC and BEC should stimulate provision for suitable courses for more mature persons who require either to be up-dated in their own field, or to be trained in new ones. (paragraphs 276-278)

APPENDIX No. 1

LIST OF ORGANISATIONS AND PERSONS WHO SUBMITTED EVIDENCE

The Committee received evidence from the following organisations, bodies, firms, establishments and individuals (those who gave oral evidence are indicated by an asterisk):

a. *Educational Organisations and Associations*

Aldermaston Court Centre for Adult Education
Association of Agricultural Education Staffs of Local Authorities
Association of British Correspondence Colleges Limited
Association of County Councils in Scotland
*Association of Education Committees
*Association for Liberal Education
*Association of Municipal Corporations
*Association of Principals of Technical Institutions
*Association of Teachers in Technical Institutions
*Association of Technical Institutions
*City and Guilds of London Institute
Civil Service Council for Further Education
*Council of Technical Examining Bodies
*County Councils Association
East Anglian Regional Advisory Council for Further Education
*East Midland Educational Union
Education Council for Heating and Ventilating
*Educational Institute of Scotland
*Inner London Education Authority
Joint Committee for National Diplomas in Baking
*Joint Committee for National Certificates and Diplomas in Building
Joint Committee for National Awards in Business Studies
Joint Committee for Higher National Certificates and Diplomas in Civil Engineering
Joint Committee for Ordinary National Certificates and Diplomas in Engineering
Joint Committee for Higher National Certificates and Diplomas in Mechanical, Production and Aeronautical Engineering
Joint Committee for Higher National Certificates and Diplomas in Medical Laboratory Subjects
*Joint Committee for National Retail Distribution Certificates
Joint Committee for Ordinary National Diplomas in Nautical Science
London Chamber of Commerce
National Association of Schoolmasters
*Northern Counties Technical Examinations Council
Project Technology (Schools Council)
Regional Advisory Council for the Organisation of Further Education in the East Midlands
Regional Council for Further Education for the South West
*Retail Trades Education Council

Royal Society of Arts
*Scottish Association for National Certificates and Diplomas
*Scottish Council for Commercial, Administrative and Professional Education
Southern Regional Council for Further Education
*Union of Educational Institutions
*Union of Lancashire and Cheshire Institutes
*Welsh Joint Education Committee
*Yorkshire Council for Further Education

b. *Industrial, Business and Training Organisations*

Agricultural, Horticultural and Forestry Industry Training Board
Agricultural Machinery and Tractor Dealers Association Limited
Association of British Chambers of Commerce
Association of the British Pharmaceutical Industry
Carpet Industry Training Board
Ceramics, Glass and Mineral Products Industry Training Board
*Chemical Industries Association
Civil Air Transport Industry Training Board
Confederation of British Industry
*Construction Industry Training Board
Cotton and Allied Textiles Industry Training Board
*Electricity Supply Industry Training Board
*Engineering Industry Training Board
Foundry Industry Training Committee
Furniture and Timber Industry Training Board
*Gas Industry Training Board
Hotel and Catering Industry Training Board
*Iron and Steel Industry Training Board
Joint Committee of the Milk Marketing Board
Local Government Training Board
Man-Made Fibres Producing Industry Training Board
Motor Industry Education Consultative Committee
Petroleum Industry Training Board
Road Transport Industry Training Board
Rubber and Plastics Processing Industry Training Board
Shipbuilding Industry Training Board
*Trades Union Congress
United Kingdom Automation Council
*Wool, Jute and Flax Industry Training Board

c. *Professional and similar Bodies*

Association of Building Technicians
Association of Mining, Electrical and Mechanical Engineers
Association of Scientific, Technical and Managerial Staffs
Association of Scientific Workers
Association of Supervising Electrical Engineers
Chartered Insurance Institute
Chartered Institute of Secretaries

College of Pathologists
Council for Professions Supplementary to Medicine
Hotel and Catering Institute
Institute of Book-keepers and Related Data Processing Limited
Institute of British Foundrymen
*Institute of Building
Institute of Chartered Accountants in England and Wales
Institute of Chartered Accountants of Scotland
Institute of Clerks of Works of Great Britain
Institute of Cost and Works Accountants
Institute of Marine Engineers
Institute of Marketing and Sales Management
Institute of Measurement and Control
Institute of Medical Laboratory Technology
Institute of Physics and the Physical Society
Institute of Quarrying
Institute of Road Transport Engineers
Institute of Science Technology
Institute of Works and Highway Superintendents
Institute of Work Study Practitioners
Institution of Agricultural Engineers
Institution of Chemical Engineers
Institution of Civil Engineers
Institution of Electrical Engineers
*Institution of Electrical and Electronics Technician Engineers
Institution of Electronic and Radio Engineers
Institution of Gas Engineers
Institution of Mechanical Engineers
Institution of Mining Engineers
Institution of Municipal Engineers
Institution of Production Engineers
Institution of Structural Engineers
Institution of Training Officers
Junior Institution of Engineers
Royal Aeronautical Society
Royal Institution of Chartered Surveyors
Royal Institute of Chemistry
Royal Institution of Naval Architects
Society of Electronic and Radio Technicians
Society of Licensed Aircraft Engineers and Technologists
Society of Technical Civil Servants
Textile Institute

d. *Individual Firms, Establishments and Others*

Allen and Hanburys Limited
Associated Electrical Industries Limited
Automative Products Company Limited
Babcock and Wilcox (Operations) Limited
Beecham Group Limited
British Aircraft Corporation (Operating) Limited
British Broadcasting Corporation

British Oxygen Company Limited
Courtaulds Limited
Electricity Council Industrial Relations Department
English Electric Company Limited
Ferranti Limited
Fisons Limited
GPO Telecommunications (Personnel Department)
*Imperial Chemical Industries Limited
Joseph Lucas Limited
Ministry of Defence (Air Force Department)
Ministry of Defence (Army)
Ministry of Defence (Navy)
*Ministry of Health
Ministry of Public Building and Works
Ministry of Technology
National Coal Board
Radio and Electronic Officers Union
A Reyrolle and Company Limited
"Shell" Research Limited
Swindon Education Committee (Borough Education Officer)
Tube Investments Limited (Personnel Department)
Unilever Limited (Training Adviser)
United Kingdom Atomic Energy Authority
University College of North Wales (F J Hyde Esq)

Colleges of Further Education:
  City of Plymouth College of Technology
  College of Aeronautical and Automobile Engineers (J A C Williams Esq)
  Coventry Technical College (R A Arculus Esq)
  Eastleigh Technical College
  Gloucester Technical College
  Harris College, Preston (T D Walshaw Esq)
  Leigh Technical College (S G Lees Esq)
  Southampton College of Technology (B R Field Esq)
  South Birmingham College of Technology (B C Whitehouse Esq)
  Staffordshire College of Technology (D E Conway Esq)
  Stretford Technical College (R D Boyd Esq)
  Swansea College of Technology (E G Cowley Esq)
  Twickenham College of Technology (M E Rosner Esq)
  Wolverhampton College of Technology (M S Page Esq)

Student Technicians at the following Colleges:
  Bradford Technical College
  Charles Keene College of Further Education, Leicester
  City of Bath Technical College
  Constantine College of Technology, Middlesbrough
  Keighley Technical College
  Letchworth College of Technology
  Llandaff Technical College
  Northampton College of Technology
  St Helens College of Technology
  Waltham Forest Technical College and School of Art
  Warley College of Technology

Individuals:

- O B Hayes Esq, Council Member of the Institute of Science Technology
- W J Kenyon Esq
- T C McNeil Esq, Headmaster, Portsmouth Technical High School
- C L Old Esq
- B M See Esq
- K Severn Esq

APPENDIX No. 2

LIST OF CGLI "END-ON" TECHNICIAN COURSES REVISED April 1969

SUBJECT	CGLI No.	COURSE TO WHICH IT RELATES
AGRICULTURE AND AGRICULTURAL ENGINEERING		
Agricultural Engineering Technicians' Course (Currently being revised as a possible "ab initio" course)	261	Agricultural Mechanics' Certificate (260)
Horticulture (Stage III) — Organisation and Management	277	Stage II Grouped Course Certificate (Now under review)
Agriculture (Stage III) — Farm Organisation and Management	278	Stage II 3 or 4 subjects 270 and 401–412
FOOD TECHNOLOGY AND CATERING		
Breadmaking and Flour Confectionery (Technicians)	156	Basic Bakery Certificate
Breadmaking and Flour Confectionery	156	Basic Bakery Certificate
Kitchen Supervision and Organisation	353	End-on to 151. Cookery for the Hotel and Catering Industry.
ELECTRICAL ENGINEERING		
Electrical Installation Work – Course C (Status under review)	51	Electrician's Cert. (B) (51)
MECHANICAL ENGINEERING		
Sheet Metal Work (Full Technological Cert. grade only) (being succeeded by 324)	66	Ordinary and Advanced Stage
Welding (Advanced level) – last exam. 1970 – being succeeded by 324 (ab initio)	74	Note: ordinary level discontinued.
Fabrication of Steelwork (FTC grade only) (being succeeded by 324 ab initio)	176	Fabrication of Steelwork (Advanced)
SHIPBUILDING		
Marine Plumbing (Full Technological Certificate grade only)	87	Final Craft Course (87)
Full Technological Certificate for the Shipbuilding Crafts	299	Adv. Craft/Final Course in Shipbuilding, Ship Joinery or Yacht and Boat Building.
CLOTHING, FOOTWEAR AND LEATHER		
Leather Manufacture, Dyeing and Finishing Technician's Certificate.	18	18. Leather Manufacture Craft Certificate.
Clothing Technology – (Last part II exam. 1970 – being succeeded by 385)	128	116. Tailors' Cutting and Tailoring and Tailoring or 126 Dress Manufacture.
Technician's Certificate in Clothing Manufacture (First exam. 1969 succeeding 128)	385	Craft Certificate in Tailoring (367) OR Craft Certificate in Women's Light Clothing Manufacture (369)
FURNITURE		
Machine Woodworking (Full Technological Certificate grade only)	81	Advanced Craft Exam. in Machine Woodworking (81)
Furniture (FTC grade) i. FTC relates to Final NOT Inter ii. Under revision	103	Final Certificate Cabinet Making, Chair Making 103A & D.
Advanced Course in Furniture Design and Manufacture (Now under revision)	103E	Craft Courses in Furniture
PAPER AND PRINTING		
FTC in Printing (Under revision)	221–4	Final Certificate in one of Compositors' Work (201) Letterpress Machine Printing (205) etc.
Printing Management (Under revision)	351	FTC in Printing
Typographic Design	200	Last exam. 1970 – end-on to Printing Craft.

SUBJECT	CGLI No.	COURSE TO WHICH IT RELATES
BUILDING		
Painters' and Decorators' Work – (Full Technological Certificate grade only)	85	Craft and Advanced Craft Certificate in Painters' and Decorators' Work (85)
General Foremanship Studies in relation to the Building Industry (Now under review)	98	Full Technological Cert. in a Building Craft subject.
Plumbing Design and Quantities – (Last exam. 1971) (being replaced by 442 (ab initio))	121	86. Plumbing Craft
FTC course for Building Subjects	291	Advanced Craft Certificates in Building Crafts
GAS, ELECTRICITY, WATER		
Gas Utilization	12	Gas fitting (13)

APPENDIX No. 3

LIST OF CGLI AB INITIO TECHNICIAN COURSES REVISED April 1969

SUBJECT	CGLI No.	REMARKS
MINING & QUARRYING		
Colliery Mechanical Technician's Certificate	189	Can be taken end-on in appropriate circumstances.
Colliery Electrical Technician's Certificate	190	
Coalmining Technician's Certificate	191	
Coal Preparation Technology	359	
FOOD TECHNOLOGY & CATERING		
Milk Processing & Control	160	Now under revision
Food Technician's Certificate	438	
CHEMICALS & ALLIED INDUSTRY		
Printing Ink Technician's Certificate	250	Last exam. 1970 – replaced by 400
and Advanced Certificate	251	
Printing Technician's Certificate	390	
Printing Ink Certificate	400	
Chemical Technician's Certificate and Advanced Certificate	315	
Paint Technician's Course	357	Uses 315 as Part I.
Plastic Technician's Course	358	
Technical and Scientific Editing	336	
METAL MANUFACTURES		
Industrial Radiography	56	
Metallurgical Technician's Certificate & Metallurgical Technician's Advanced Certificate	154 155	Last exams for 154 and 155 probably in 1970. Now to be replaced by new scheme for Metallurgical Technician's Cert. Part 1 and Part II (and possibly Part III) to be drawn up. This will be ab initio.
Foundry and Patternshop Technician's Certificate	321	
ELECTRICAL ENGINEERING		
Telecommunication Technicians' Course	49	
Electrical Engineering Practice	52	Now mainly used by overseas candidates.
Electrical Technicians' Courses	57	
Illuminating Engineering	113	
Radio, Television and Electronics Technicians' Course	434	
Electrical Installation Technicians	451	
MECHANICAL ENGINEERING		
Engineering Planning, Estimating and Costing	64	May be taken after any engineering technician course
Industrial Measurement and Control Technician's Certificate	310	
Instrument Production Technician's Certificate	312	Uses 293 Part I
Heating, Ventilating and Air Conditioning Technician's Certificate	339	Can be taken end-on in appropriate circumstances
Fabrication and Welding Engineering Technician's Certificate	324	
Science and Technology of Refrigeration	73	May be taken after the ONC in Engineering
Mechanical Engineering Technicians' Course	293	
SHIPBUILDING		
Shipbuilding Technicians' Course	289	

SUBJECT	CGLI No.	REMARKS
VEHICLES		
Vehicle Body Engineering Technician's Certificate	318	
Motor Vehicle Technician's Certificate	170	The old scheme (last examination in 1969) is taken end-on to 168 Motor Vehicle Mechanics. New Scheme can be taken end-on in appropriate circumstances.
Aeronautical Engineering Practice	171	Ending 1969 being succeeded by 371
Aircraft Electrical Practice	175	Ending 1969 being succeeded by 371
Aeronautical Engineering Technician's Certificate	371	
DISTRIBUTIVE TRADES		
*National Retail Distribution Certificate	133	
*Certificate in Retail Management Principles	136	
Dispensing Technician's Certificate	431	
PAPER & PRINTING		
Science and Technology of Paper and Board Making	166	
Design for Printing	382	First exam. 1969 succeeding 200
Printing Technician's Course	390	First exam. 1969
BUILDING		
Structural Detailing	430	Now under review
Structural Engineering (now under review)	91	May be taken after ONC (last examination under existing arrangements in 1970)
Construction Technician's Certificate	314	
Builders' Quantities	89	May be taken after Construction Technician's Certificate (314) or ONC.
Plumbing Technician's Certificate	442	May also be taken end-on to craft (86) Plumber's Work.
Concrete Technology (Supervisory level)	110	Relates to 314 Construction Technician's Certificate or 93 Concrete Practice
Formwork Planning and Design	356	Relates to 314 Construction Technician's Certificate or 95 Formwork for Concrete Construction
TEXTILES		
Woollen and Worsted-Raw Materials	30A	Old scheme. Last exam. 1969
Technician's Certificate in Wool Textiles Raw Materials	30A	New scheme. First exam. 1967
Woolcombing	30B	
Technician's Certificate in Worsted Spinning	30C	
Technician's Certificate in Woollen Yarn Manufacture	30D	
Woollen and Worsted—Weaving-Design	30E	First exam. 1968. New scheme
Woollen and Worsted—Weaving and Tuning	30F	
Woollen and Worsted Weaving—Finishing	30G	
Yarn Production	32	Short Staple System
Weaving	34	Cotton and Man-made Fibres
Technician's Certificate in Flax Spinning	35	
Technician's Certificate in Linen Weaving	36	
The Manufacture of Silk and Man-made Fibres	37	
Production Technology	38/39	Last exam. 1969
Technician's Certificate in Jute Manufacture	350	

*A Joint Committee award (please see Appendix No. 6)

SUBJECT	CGLI No.	REMARKS
Manufacture of Hosiery and Knitted Goods	40	
Mill Engineering and Services	41	Being succeeded by 375 last exam. 1970
Industrial Organisation	42	Being succeeded by 375 last exam. 1970
Chemistry as applied to the Textile Industry	43	Being succeeded by 375 last exam. 1970
Appreciation of Colour and Design	44	Being succeeded by 375 last exam. 1970
The Dyeing of Textiles	45	
Technician's Certificate in Smallware Weaving	365	
Textile Organisation and Control	375	
Technician's Certificate in Carpet Loom Tuning	420	
Net Manufacture	915	
MISCELLANEOUS		
Photography	107	Last exam 1969 being succeeded by 345
Dental Technician's Certificate	117	
Dental Technician's Advanced Certificate	118	
Science Laboratory Technician's Ordinary and Advanced Certificate	119	Now under review
Technical Illustration	228	Last exam 1971 – being replaced by 416
Technical Authorship (New scheme)	229	Technical Writing (329)
Certificate for Computer Programming and Information Processing	319	
Advanced Certificate for Computer Personnel	320	
Photographic Technician's Certificate	345	
Beauty Therapist's Certificate	397	
Certificate in Cleaning Science	398	
Technical Graphics	416	
Work Study	195	Also end-on to all craft schemes in so far as it is a second discipline
Certificate in Carpet Loom Tuning	420	Final
Structural Engineering Technician's Certificate	430	
Dispensing Technician's Certificate	431	
Non-Destructive Testing Technicians	432	
Quality Control	445	
Traffic Engineering Technician's Certificate	317	May be taken after successful completion of the second year T(2) of a Technician Course

AB INITIO TECHNICIAN EXAMINATIONS: Entries and Passes UK 1962–1967*

Subject Group	1962		1963		1964		1965		1966		1967	
	Entries	Passes	Entries	Passes	Entries	Passes	Entries	Passes	Entries	Passes	Entries	Passes
MINING AND QUARRYING	1,055	448	1,265	597	1,321	749	1,217	774	1,054	706	682	422
FOOD TECHNOLOGY AND CATERING	126	75	180	108	162	117	168	130	201	152	211	169
CHEMICALS AND ALLIED INDUSTRY	50	27	63	35	68	39	108	59	227	134	459	323
METAL MANUFACTURES	9	4	23	9	116	79	228	112	516	292	709	476
ELECTRICAL ENGINEERING	38,102	21,133	41,285	21,517	45,021	26,624	46,635	27,893	57,501	35,942	61,399	38,799
MECHANICAL ENGINEERING	487	342	8,597	4,938	15,793	9,201	18,832	12,375	22,475	15,410	26,554	18,557
SHIPBUILDING	—	—	—	—	—	—	71	41	103	57	196	119
VEHICLES	1,728	936	1,871	942	2,016	1,445	2,309	1,549	2,480	1,948	3,469	2,712
DISTRIBUTIVE TRADES	486	210	956	530	939	366	942	574	964	628	1,034	607
PAPER AND PRINTING	—	—	47	16	44	23	41	30	53	29	66	40
BUILDING	2,438	1,695	2,223	1,574	2,237	1,471	2,667	1,787	4,202	2,900	4,059	2,916
TEXTILES	1,922	1,354	2,187	1,435	2,196	1,569	2,460	1,748	2,478	1,769	2,379	1,630
MISCELLANEOUS	2,509	1,477	3,245	1,823	3,569	2,202	3,721	2,424	4,081	2,622	4,517	3,104
Totals	48,912	27,701	61,942	33,524	73,482	43,885	79,399	49,496	96,335	62,589	105,734	69,874

*Notes: 1. This Table includes CGLI and REB candidates.

2. Separate figures for candidates entering and passing grouped course and single paper examinations are not available. This Table, therefore, shows the total number of examinations – grouped and single paper – taken in each year.

APPENDIX No. 4

COURSES, CANDIDATES AND RESULTS IN THE NON-TECHNICAL SECTOR

ORDINARY NATIONAL CERTIFICATE IN BUSINESS STUDIES

The course for this Certificate, which is of two years' duration on a part-time day and/or evening basis, was established in 1961. Its aim is to provide a broad background of study for school leavers wishing to embark on a business career. Although for many it is regarded as a qualification in its own right, for others it is taken as a step towards the attainment of a HNC or HND in Business Studies or a professional qualification. Most leading professional bodies in the business sector give subject for subject exemption from their intermediate examination requirements to students who have obtained an examination mark in the subject of fifty per cent or above. A good overall performance in the Certificate also gives entry into a CNAA and some university degree courses. The normal entry qualifications for the ONC course is either four GCE ordinary level passes (or CSE grade I) including English language or literature and preferably mathematics or another quantitative subject; or the COS with credit passes in English and general studies, clerical duties and one other subject.

ORDINARY NATIONAL DIPLOMA IN BUSINESS STUDIES

The course for the Diploma was also introduced in 1961. Most courses are of two years' duration and are taken on a full-time basis, although a few sandwich courses are offered. Because of the additional time available more subjects are studied in the OND course than in the ONC course and the study is taken to a deeper level. While the aims of the OND course and its entry requirements are the same as those for the ONC, a higher standard of attainment is expected, although the criteria for subject for subject exemptions from professional examinations is similar and a good standard of performance is required to qualify holders of the Diploma for entry into CNAA or university degree courses.

HIGHER NATIONAL CERTIFICATE IN BUSINESS STUDIES

The course leading to the Certificate, which is of two years' duration on a part-time day and/or evening basis, was also introduced in 1961. It is intended for students who wish to continue their studies beyond the ONC stage whether or not their ultimate purpose is to take a specialist professional qualification. Some exemptions are granted by professional bodies in the business sector from their examinations for students who have passed equivalent subjects in HNC examinations. Although the course is vocational it is not intended as an education in specialist techniques but as a means of broadening the outlook of students and making them aware of industrial and commercial problems and possible methods of solution. Students who are 18 years of age are allowed into the course if they hold an ONC or OND in Business Studies or two GCE advance level passes in subjects related to business studies. Students over the age of 21 who have taken a one year conversion course may also qualify for entry into the HNC.

HIGHER NATIONAL DIPLOMA IN BUSINESS STUDIES

Courses for the Diploma were introduced in 1962. They may be taken either on a 3 year sandwich basis, with approximately half of the time spent in industry or commerce, or as a two-year full-time course. In the latter case the student does not receive the Diploma until he has acquired at least one year of business and administrative experience. Subject for subject exemptions from the examination requirements of professional bodies in the business sector are granted on the same basis as for the HNC in Business Studies. The course is designed to provide a combination of general and specialist education for business, and the standard required in the subjects is above that for the HNC subjects. To qualify for entry into the course students must normally be at least 18 years of age and hold an ONC or OND in Business Studies or a GCE or equivalent with a pass in at least one subject at Advanced level.

ORDINARY NATIONAL CERTIFICATE IN PUBLIC ADMINISTRATION

This is a new part-time day or block release course and was introduced in 1968; the first Certificates will be awarded in 1970. The course is designed to meet the needs of young civil servants, officers in local government and the nationalised industries and others working in similar fields of employment. Entry qualifications for the course are similar to those for the ONC in Business Studies. The course is also open to people holding certain clerical and other posts in the civil service or local government.

THE CERTIFICATE IN OFFICE STUDIES*

This national award was introduced in 1963 for young office workers, other than typists and shorthand typists, who wish to take grouped courses of further education in commerce, but who do not possess the educational qualifications required for entry to a course leading to the ONC in Business Studies. The Certificate is a worthwhile qualification in its own right, and the course was designed with this end in view. For some students, however, it is a step to the ONC in Business Studies, since a Certificate in Office Studies with certain credit passes, achieved within a period of not more than two successive examinations, can count towards the ONC entry requirements. The course for the Certificate is of two years' duration on a part-time day basis and no formal academic standard of entry is prescribed. It is intended for students who have continued their education until about 16 years of age either by way of a fifth year at a secondary school or by following an appropriate one-year full-time or part-time course at a further education establishment after leaving school at 15. The examinations for the Certificate are conducted by the six REBs, the Royal Society of Arts and the London Chamber of Commerce.

HIGHER CERTIFICATE IN OFFICE STUDIES

Courses for the Higher Certificate in Office Studies will commence in 1969. They will be arranged in two stages (Part I and Part II) each stage consisting of a one year part-time day course, and certificates will be awarded to students who are successful at the first stage but do not wish to proceed further. The course is designed to continue to a higher level and studies commenced in the Certificate in Office Studies for students employed in certain technician-level grades in the business sector and entry into Part I will be open to students who have been successful in the COS. Students who have failed the second year of the ONC in Business Studies will also be allowed entry into Part I of the HCOS. The examinations will be conducted by the six REBs, the Royal Society of Arts and the London Chamber of Commerce.

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*Although the COS is not regarded as a technician-level course, this description of courses in the non-technical sector would not be complete without it.

NATIONAL RETAIL DISTRIBUTION CERTIFICATE*

This 2 year part-time day and/or evening only course, which was established in 1951, is intended for students who have received full-time education up to 16 years of age or have passed the Retail Trades Junior Certificate (recently revised as the Certificate in Retailing). It is designed to provide a background of general education and some specialist commodity study suitable for young people employed in retail distribution. Apart from forming a complete course in itself the course serves as an introduction to the Certificate in Retailing Management Principles course, or to the final year of courses leading to the qualifications of certain organisations in the retail trade. The final examinations for the Certificate are conducted by the CGLI although the award depends upon the achievement of similar standards of course attendance and classwork to those required in national certificates. The course is at present under review.

CERTIFICATE IN RETAILING MANAGEMENT PRINCIPLES

This is a 2 year part-time day and/or evening only course designed for students of 21 years of age or above who have acquired experience in a retail establishment. Before entry into the course students are expected to have undertaken a previous course of further education in the retail trade (e.g. the National Retail Distribution Certificate or a qualification of one of the retail trade associations). A recent revision of the regulations for the course allows admission to students who have reached the age of 20 or have received full-time education up to the age of 18 with at least one year's experience in the trade. The course consists of 8 subjects, in 2 non-progressive parts, and is intended for aspirants to the position of departmental manager in large retail establishments and for those managing, or likely to manage, smaller establishments. The examination arrangements and the criteria for award of Certificates are the same as those for the National Retail Distribution Certificate. This course also is under review at present.

STRUCTURE OF COURSES

The attached diagram is intended to illustrate the relationship between the COS and HCOS; the ONC, OND, HNC and HND in Business Studies; and the ONC in Public Administration. It also shows the relationship between the National Retail Distribution Certificate and Certificate in Retail Management Principles. There is no formal progressive route between the courses in retail distribution and the others in the diagram.

NUMBERS OF STUDENTS AND CANDIDATES

The growth in the numbers of students enrolled for Business Studies courses is illustrated by the following table.

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*The National Retail Distribution Certificate course has been included in the Committee's review although there is some doubt whether it is of technician-level.

STUDENTS ON BUSINESS COURSES LEADING TO RECOGNISED QUALIFICATIONS

	1964–65	1965–66	1966–67	1967–68
Certificate in Office Studies	5,686	7,467	8,495	8,807
ONC in Business Studies	12,734	12,885	13,164	13,962
OND in Business Studies	5,188	5,585	5,987	6,458
Other non-advanced Business courses	52,642*	55,536*	60,466*	61,671*
All non-advanced business courses	76,250*	81,473*	88,112*	90,898*
HNC in Business Studies	2,956	3,495	4,481	5,247
HND in Business Studies	1,848	2,377	3,275	4,364
First degrees in business courses	1,399	5,245(a)	5,750(a)	7,604(a)
Other advanced business courses	21,978*	22,325*	30,175*	35,047
All advanced business courses	28,181*	33,442*	43,681*	52,262*
All courses	104,431*	114,915*	131,793*	143,160*

Notes on the above table:

1. For the purposes of this table business courses include courses in social, administrative and business studies.
2. The figures marked (a) include CNAA degrees.
3. Owing to the variation in subject classifications from year to year, the figures marked with an asterisk are not strictly comparable.

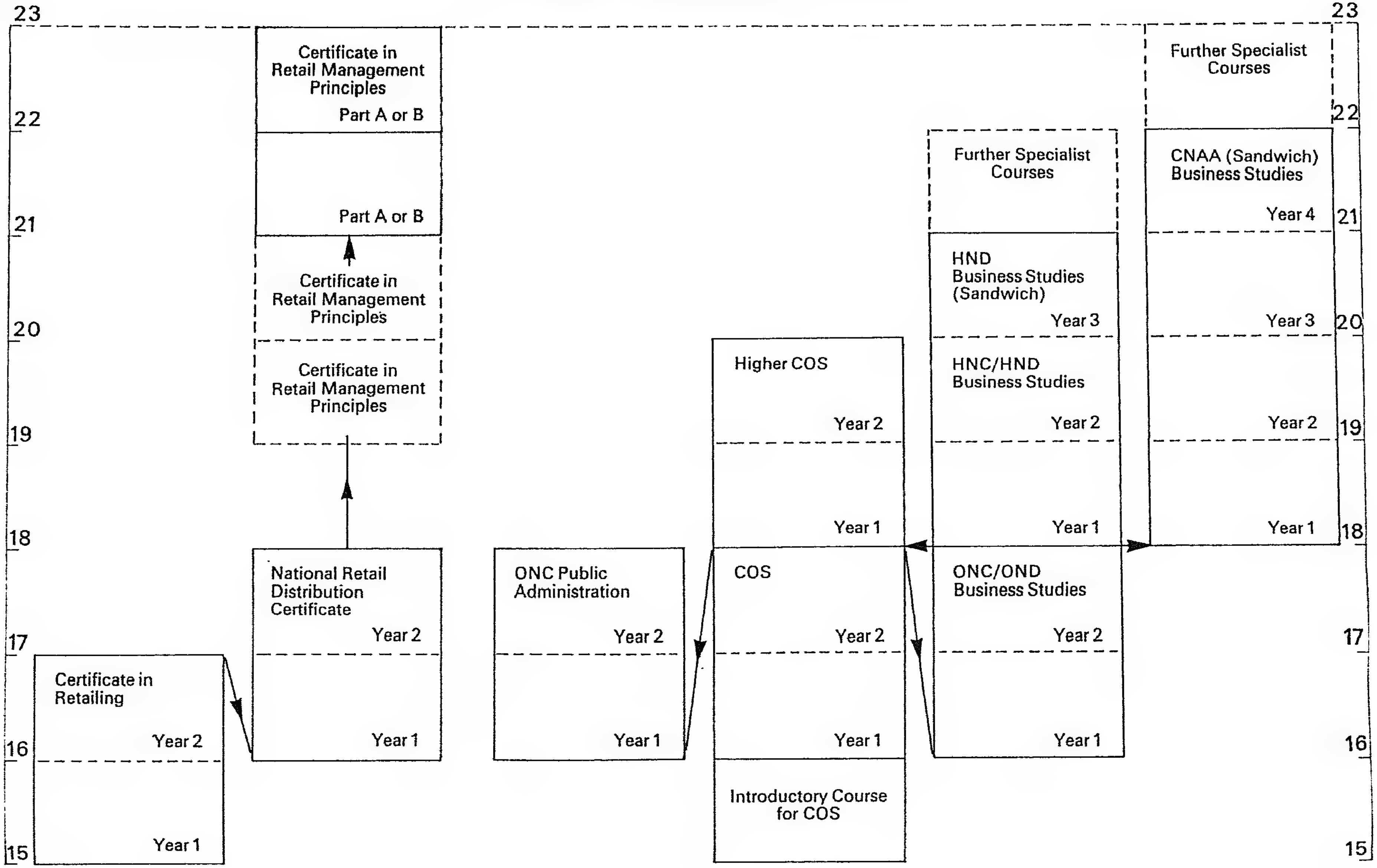
CANDIDATES FOR AWARDS

The numbers of candidates for the established Certificates and Diplomas described in this Appendix are given in the attached table. The numbers of candidates for Parts A and B of the Certificate in Retail Management Principles are given separately as the course is not progressive and consequently there is no terminal year.

CANDIDATES FOR BUSINESS QUALIFICATIONS

	1962		1963		1964		1965		1966		1967		1968	
	Entries	Passes	Entries	Passes	Entries	Passes	Entries	Passes	Entries	Passes	Entries	Passes	Entries	Passes
Business Studies														
ONC	1,547	725	2,769	1,251	2,988	1,504	3,314	1,637	3,637	1,811	3,953	2,119	3,935	2,188
OND	—	—	596	405	1,063	734	1,602	1,134	2,000	1,320	2,158	1,469	2,366	1,684
HNC	56	53	671	556	861	697	977	756	1,025	775	1,453	1,068	1,695	1,310
HND	9	9	38	28	193	163	550	426	848	702	968	768	1,554	1,216
Retail Distribution														
National Retail Distribution Certificate	293	171	660	452	718	368	721	396	699	366	745	414	723	348
Certificate in Retail Management Principles														
Part A	80	22	114	53	98	30	111	60	116	63	128	78	117	79
Part B	95	51	101	36	110	35	100	71	97	67	117	88	133	97
Office Studies														
COS	—	—	—	—	—	—	1,406	956	2.001	1.450	2,626	2,057	2,632	2,114

COURSES IN BUSINESS STUDIES


23
22
21
20
19
18
17
16
15
Certificate in Retailing
Year 2
Year 1
National Retail Distribution Certificate
Year 2
Year 1
Certificate in Retail Management Principles
Certificate in Retail Management Principles
Certificate in Retail Management Principles
Part A or B
Part A or B
ONC Public Administration
Year 2
Year 1
Introductory Course for COS
COS
Year 1
Year 2
Higher COS
Year 1
Year 2
ONC/OND Business Studies
Year 1
Year 2
HNC/HND Business Studies
Year 1
Year 2
HND Business Studies (Sandwich)
Year 3
Further Specialist Courses
CNAA (Sandwich) Business Studies
Year 1
Year 2
Year 3
Year 4
Further Specialist Courses

APPENDIX No. 5

THE CITY AND GUILDS OF LONDON INSTITUTE, THE REGIONAL EXAMINING BODIES AND THE COUNCIL OF TECHNICAL EXAMINING BODIES

This Appendix contains an account of the organisation and functions of the City and Guilds of London Institute, with details of the Regional Examining Bodies and a brief note on the work of the Council of Technical Examining Bodies.

A. THE CITY AND GUILDS OF LONDON INSTITUTE

The City and Guilds of London Institute examines over three hundred thousand candidates a year for operative, craft and technician qualifications covering all sectors of industry and a few sectors of commerce. The Institute was founded in 1878 and in 1900 was granted a Royal Charter as an educational association for the advancement and application (to quote from the Charter itself): " . . . all such branches of Science and the Fine Arts as benefit or are of use to . . . productive and technical industries especially and to commerce and industry generally. . . .". The Charter relates to all levels of technician and scientific education and in the early days of its existence the Institute founded the Central Institute, which as the City and Guilds College now forms the Engineering Section of the Imperial College of Science and Technology, the Finsbury Technical College (closed in 1926) and the City and Guilds Art School at Kennington, London. The Institute is, however, best known for the system of courses and examinations which it devises and administers and the qualifications it awards.

THE ORGANISATION AND ADMINISTRATION OF THE INSTITUTE

The Council of the Institute, the members of which are appointed under Statutes approved by the Privy Council, elects an Executive Committee which, as the premier executive body of the Institute, is responsible finally for approving schemes for courses and examinations. The development and application of the Institute's policy is guided by two committees: a Policy Committee for Education and Training and a Committee for Technical Education. These Committees include representatives of the Department of Education and Science; the Scottish Education Department; the Ministry of Education, Northern Ireland; associations of local authorities; regional advisory councils; regional examining bodies; teachers' associations; industrial representatives; and co-opted members. The Institute is advised by some 200 Advisory Committees on the development of specific courses and relevant examinations and these committees have similar constitutions. The Director General of the Institute, as chief executive officer, is responsible for advising the Executive, Technical Education and Policy Committees and for interpreting the Institute's policy and putting into effect the approved schemes for courses and examinations. The Institute maintains a professional graduate staff concerned with the work of all the committees and the conduct of the examinations.

PROCEDURE FOR THE INTRODUCTION OF A CITY AND GUILDS' SCHEME

Requests for new schemes for courses and examinations are first considered by the Technical Education and Policy Committees. If the request is regarded as being in accord with the policy of the Institute, an Exploratory Committee is set up with a constitution similar to that of an Advisory Committee. The Exploratory Committee draws up a scheme appropriate to the educational needs of the students for whom it is intended. The scheme will set out the aims and standards of the proposed course, the examinations regarded as appropriate together with notes of guidance for teachers, and will take into account the numbers of students likely to be involved, the relevant training schemes and the resources of colleges. The report of the Exploratory Committee is submitted to the Committee for Technical Education which considers whether the proposed scheme is feasible and educationally and industrially sound. The Policy Committee is concerned that the scheme accords with the broad policy of the Institute in relation to further education and industrial training. In the light of the recommendations of these two Committees the scheme is formally adopted for the Institute by the Executive Committee and details are published. The Exploratory Committee is then reconstituted as the Standing Advisory Committee for the subject and is responsible for the review of syllabuses so as to maintain the relevance of syllabuses and examinations to current industrial and educational practice. The Standing Advisory Committee also maintains contacts with colleges providing courses, recommends examiners for appointment by the Institute, moderates (through a confidential sub-committee) the examination question papers and generally advises the Institute on all matters connected with the scheme.

FINANCING OF EXAMINATIONS

The major part of the Institute's income, about ninety per cent, is derived from examination fees, the remainder coming largely from subscriptions and donations and the interest on investments. The Institute's expenditure is almost entirely devoted to the development and general administration of examinations.

B. REGIONAL EXAMINING BODIES

The six Regional Examining Bodies offer examinations for operatives, craftsmen and technicians within the terms of the revised agreement between the CGLI and the REBs concluded in 1966*. The REBs also offer examinations in commercial and other subjects as well as for some ordinary and higher national certificates. Each operates in its own territory, and all are associated with the Advisory Committees of the CGLI, as well as with the Institute's Committee for Technical Education.

The six REBs are as follows:

Name	*Address*
Union of Educational Institutions	Norfolk House Smallbrook Ringway Birmingham 5
Welsh Joint Education Committee	30 Cathedral Road Cardiff
East Midland Educational Union	Robins Wood House Robins Wood Road Aspley Nottingham NG8 3NH

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*Promulgated in DES Administrative Memorandum 2/66

Yorkshire Council for Further Education	Bowling Green Terrace Jack Lane Leeds 11
Union of Lancashire and Cheshire Institutes	36 Granby Row Manchester MI 6WD
Northern Counties Technical Examinations Council	5 Grosvenor Villas Grosvenor Road Newcastle upon Tyne 2

C. COUNCIL OF TECHNICAL EXAMINING BODIES

The Council was established "to consider any matter of common interest to member bodies, make recommendations thereon to members and to other bodies and to take such action as may be deemed necessary". The members of the Council consist of representatives of the CGLI and the six REBs. In April 1967 the constituent members of the Council agreed arrangements† to be made to prepare new and revised courses of further education arising from the recommendations of the industrial training boards.

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†Promulgated in DES Administrative Memorandum 25/67.

APPENDIX No. 6

ORGANISATION AND FUNCTIONS OF A JOINT COMMITTEE

A joint committee is composed of members nominated by professional bodies, one or more of the Education Departments as appropriate, and the organisations representing the colleges, principals and teachers. Certain joint committees also include representatives of other interested organisations, such as associations of employers and employees and the ITBs. The secretariat of a joint committee is normally provided by the professional body with the major interest in the qualifications, but a number are serviced by the Department of Education and Science. These are marked with an asterisk on the list below.

A committee sets entry requirements and approves courses and syllabuses for the subjects within its responsibility. Colleges are at liberty to set and mark their own examinations, although some use the machinery of the REBs, and of the Royal Society of Arts or London Chamber of Commerce in the case of business studies, for their national certificate examinations, particularly at the ONC level. All national certificate and diploma examinations are subject to external moderation and assessment by assessors appointed by the committees.

LIST OF JOINT COMMITTEES AND THE QUALIFICATIONS THEY AWARD

*JOINT COMMITTEE FOR NATIONAL AWARDS IN AGRICULTURAL SUBJECTS

Ordinary National Diploma in Agricultural Subjects
Higher National Diploma in Agricultural Subjects

JOINT COMMITTEE FOR NATIONAL DIPLOMAS IN BAKING

National Diploma in Baking

JOINT COMMITTEE FOR HIGHER NATIONAL CERTIFICATES AND DIPLOMAS IN APPLIED BIOLOGY

Higher National Certificate in Applied Biology
Higher National Diploma in Applied Biology

*JOINT COMMITTEE FOR NATIONAL CERTIFICATES AND DIPLOMAS IN BUILDING

Ordinary National Certificate in Construction
Ordinary National Diploma in Building
Higher National Certificate in Building
Higher National Diploma in Building

*JOINT COMMITTEE FOR NATIONAL AWARDS IN BUSINESS STUDIES AND PUBLIC ADMINISTRATION

Ordinary National Certificate in Business Studies
Ordinary National Diploma in Business Studies
Higher National Certificate in Business Studies
Higher National Diploma in Business Studies
Ordinary National Certificate in Public Administration

JOINT COMMITTEE FOR NATIONAL CERTIFICATES AND DIPLOMAS IN CHEMISTRY AND APPLIED CHEMISTRY

Higher National Certificate in Chemistry and Applied Chemistry
Higher National Diploma in Chemistry and Applied Chemistry

JOINT COMMITTEE FOR HIGHER NATIONAL CERTIFICATES IN CHEMICAL ENGINEERING

Higher National Certificates in Chemical Engineering

*JOINT COMMITTEE FOR HIGHER NATIONAL CERTIFICATES AND DIPLOMAS IN CIVIL ENGINEERING

Higher National Certificate in Civil Engineering
Higher National Diploma in Civil Engineering

JOINT COMMITTEE FOR NATIONAL CERTIFICATES AND DIPLOMAS IN ELECTRICAL AND ELECTRONIC ENGINEERING

Higher National Certificate in Electrical and Electronic Engineering
Higher National Diploma in Electrical and Electronic Engineering

JOINT COMMITTEE FOR ORDINARY NATIONAL CERTIFICATES AND DIPLOMAS IN ENGINEERING

Ordinary National Certificate in Engineering
Ordinary National Diploma in Engineering

JOINT COMMITTEE FOR HIGHER NATIONAL CERTIFICATES IN ENGINEERING AND HIGHER NATIONAL DIPLOMAS IN MECHANICAL, IN PRODUCTION AND IN AERONAUTICAL ENGINEERING

Higher National Certificate in Engineering
Higher National Diploma in Mechanical Engineering
Higher National Diploma in Production Engineering
Higher National Diploma in Aeronautical Engineering

JOINT COMMITTEE FOR NATIONAL DIPLOMAS IN FOOD TECHNOLOGY

Ordinary National Diploma in Food Technology
Higher National Diploma in Food Technology

JOINT COMMITTEE FOR HIGHER NATIONAL CERTIFICATES AND DIPLOMAS IN FOUNDRY TECHNOLOGY

Higher National Certificate in Foundry Technology
Higher National Diploma in Foundry Technology

JOINT COMMITTEE FOR NATIONAL DIPLOMAS IN HOTEL KEEPING AND CATERING

Ordinary National Diploma in Hotel and Catering Operations
Higher National Diploma in Hotel and Catering Administration

JOINT COMMITTEE FOR NATIONAL DIPLOMAS IN INSTITUTIONAL MANAGEMENT

Ordinary National Diploma in Institutional Housekeeping and Catering
Higher National Diploma in Institutional Management

JOINT COMMITTEE FOR HIGHER NATIONAL CERTIFICATES AND DIPLOMAS IN MATHEMATICS, STATISTICS AND COMPUTING

Higher National Certificate in Mathematics, Statistics and Computing
Higher National Diploma in Mathematics, Statistics and Computing

JOINT COMMITTEE FOR HIGHER NATIONAL CERTIFICATES AND DIPLOMAS IN MEDICAL LABORATORY SUBJECTS

Higher National Certificate in Medical Laboratory Subjects
Higher National Diploma in Medical Laboratory Subjects

JOINT COMMITTEE FOR HIGHER NATIONAL CERTIFICATES AND DIPLOMAS IN METALLURGY

Higher National Certificate in Metallurgy
Higher National Diploma in Metallurgy

JOINT COMMITTEE FOR NATIONAL CERTIFICATES AND DIPLOMAS IN MINING AND HIGHER NATIONAL CERTIFICATES IN MINING SURVEYING

Ordinary National Certificate in Mining
Higher National Certificate in Mining
Higher National Diploma in Mining
Higher National Certificate in Mining Surveying

*JOINT COMMITTEE FOR THE AWARD OF NATIONAL RETAIL DISTRIBUTION CERTIFICATES

National Retail Distribution Certificate
Certificate in Retail Management Principles

*JOINT COMMITTEE FOR ORDINARY NATIONAL DIPLOMAS IN NAUTICAL SCIENCE

Ordinary National Diplomas in Nautical Science

JOINT COMMITTEE FOR NATIONAL CERTIFICATES AND DIPLOMAS IN NAVAL ARCHITECTURE

Ordinary National Certificate in Naval Architecture and Shipbuilding
Ordinary National Diploma in Naval Architecture and Shipbuilding
Higher National Certificate in Naval Architecture and Shipbuilding
Higher National Diploma in Naval Architecture and Shipbuilding

JOINT COMMITTEE FOR NATIONAL CERTIFICATES AND DIPLOMAS IN APPLIED PHYSICS

Higher National Certificate in Applied Physics
Higher National Diploma in Applied Physics

JOINT COMMITTEE FOR NATIONAL CERTIFICATES AND DIPLOMAS IN PRINTING

Ordinary National Certificate in Printing
Higher National Certificate in Printing
Ordinary National Diploma in Printing
Higher National Diploma in Printing

JOINT COMMITTEE FOR NATIONAL CERTIFICATES AND DIPLOMAS IN SCIENCES

Ordinary National Certificate in Sciences
Ordinary National Diploma in Sciences

JOINT COMMITTEE FOR NATIONAL CERTIFICATES AND DIPLOMAS IN TEXTILES

Ordinary National Certificate in Textiles
Ordinary National Diploma in Textiles
Higher National Certificate in Textiles
Higher National Diploma in Textiles

APPENDIX No. 7

A NEW PATTERN OF COURSES FOR ENGINEERING TECHNICIANS

1. The nature and objectives of the pattern can best be understood by first considering the needs of the majority which we have represented by the "Main Routes" in Fig. 1. These are the students leaving full-time education at age 16 and entering industry with the intention of becoming technicians in engineering. Those students who first enter the craft route and transfer to the technician field at a later stage, or who remain in full-time education until 17 or 18, would follow the "Alternative Routes" in Fig. 2 and are dealt with separately in the latter part of this appendix.

2. Two basic types of engineering technician, for which we see a continuing need, have emerged in the field of engineering. One is mainly concerned with the practical approach to the work required in some technician jobs. The other requires a considerable theoretical background in order to understand, operate and control the increasingly complex and sophisticated equipment and systems coming into use. In addition to taking account of these two basic types, the pattern of courses must cater for different levels of ability and job requirements within each and provide opportunities for progression and transfer. In planning the courses to take account of these and of other factors mentioned later, three distinct stages have emerged.

STAGE I

3. This stage concerns the studies to be undertaken in the two-year period 16-18 and the award of a Technician Certificate (TC) or Technician Diploma (TD) on the successful completion of the prescribed studies. Before we consider the main form of these studies it is necessary to take account of the kind of student entering them since this itself affects the form they should take and the method of treatment involved.

4. Although school reports, examination successes, interviews and tests provide both the employer and the college with useful guidance for initial selection, they do not provide a completely reliable prognosis. Transfer from school to employment and other factors can cause significant changes in motivation and so part of the course must include a diagnostic function such as is now available with the G course. Part of the course must also deal with the student who, having the necessary ability, needs to make good deficiencies in basic knowledge on which the course is built because of lack of response or opportunity at school. All of this will require a greater involvement and more flexible approach by both employer and teacher. For example, in the early stages, a student-centred learning approach may prove more effective than subject-teaching to a class for meeting individual needs.

5. It will be seen from Fig. 1 that the basic course contains two elements B and C. The B element is intended to complement the broad basic training requirements of all engineering technicians. Its content need not go beyond the support for these requirements except for the inclusion of material to ensure an educationally coherent course. The approach to, and the treatment of, the subjects of the course would be on the lines of the present "ab-initio" T courses. It is thought that the majority of technicians in engineering will find the B ele-

ment sufficient to meet the initial educational demands of their work. Whilst a few technicians may terminate their studies at this point, most will regard the course as a foundation upon which may be built a range of educational "bricks" to complement the training requirements of specific jobs. We therefore regard the completion of the B element as a significant stage in the education of the technician and propose that this be marked by the award of a Technician Certificate (TC) to successful students. This award will also qualify its holder to follow a course of studies leading to the Higher Technician Certificate (HTC) dealt with later.

6. There will be some students who, having the necessary ability, see their goal as the posts requiring the more extensive theoretical background mentioned in paragraph 2. These will require a course which, in addition to dealing with the B element, provides a deeper understanding of its principles and fundamentals and which broadens its studies, particularly in the fields of mathematics and physical sciences. The C element in stage I represents the additional study for those students who require the appropriate foundation on which to build more advanced theoretical studies at a later stage. Students who successfully complete a course covering both the B and C elements would be awarded a Technician Diploma (TD) and this would qualify them to follow a course of studies leading to the HTC or to the Higher Technician Diploma (HTD).

7. Whilst a technician who has already been awarded a TC should be able to earn a TD by a further period of study, it is not intended that the C element should be primarily regarded as a simple addition to the B element. Because of differences in content and approach, the B and the B+C courses should each be planned as a separate course in its own right. Since the B+C course would include the content of the B course, a student who, after the diagnostic period dealt with in the following paragraph, remains in the B+C course and fails to qualify for a TD award would be eligible, subject to performance, for a TC award.

8. In Fig. 1, the C element is indicated intentionally as increasing in content with progression through the course because of the need for a diagnostic facility. At the start of the course the students can be divided into three groups viz B only, clearly B+C and possibly B+C. The initial smaller content of the C element will provide time for the students, mentioned in paragraph 4, with the requisite ability to make good deficiencies. It should, however, prove adequate as a test in which to sort out the "possible B+C" group during the first term. Thereafter, the increasing content of the C element would provide a further check of the remaining "possible B+C" students. Depending on the pattern of courses which finally emerges, it may be possible to give a student who completes a substantial part of the B+C course before reverting to the B course, a credit towards a later study for the TD award. A curved line has been used on the diagram for convenience and to avoid implying a particular arrangement but it is expected that the practical arrangement, particularly with block release courses, will be some form of stepped increase.

9. It is neither possible nor desirable at this stage to give any precise indication of the time required for the study of the B and C elements since this is a matter on which the TEC should give guidance after it has decided on the content and depth of treatment. Current experience suggests, however, that the B+C course

is not likely to require more than the equivalent of 2 days per week for the two years. A block release system seems to be the best way of achieving this, particularly if variation in the lengths of the individual blocks is possible to take account of the diagnostic aspect of the "possible B + C" course.

10. Students who complete Stage I (because of errors in initial selection or subsequent performance some will move across into the craft route) can be expected to do one of three things. Some, because they have reached their ceiling or for other reasons, will not proceed to a higher qualification. They will be able, however, to take specialist courses relevant to their continued industrial training and occupations. Others, if their performance in the TD examination warrants it, will seek entry to HND or degree courses. The majority will continue their studies in one of the routes indicated in Stage II of Fig. 1.

STAGE II

11. Students with a TC, and perhaps some with a TD, will seek to extend their previous education by studies which retain the more practically biased approach of the B course and which provide a comprehension of the developing skills of the technician which they will be called upon to exercise. Because of the range of ability to be expected within this large group and the variety of posts they will occupy, not only will different lengths of study be required but also differences of breadth and depth and even of timing in respect of the start of the course. The diffuse nature of these demands may best be met by organising the provision as a series of "bricks" or modules. Some additional theory, and possibly mathematical studies, beyond the B course will be necessary to enable the student to appreciate the special subject. In a few cases this might be included in the special subject itself but generally the mathematics and theory would better be provided as a preparatory core of study. This is indicated by the rectangle labled "Common Core" in figure 1. Until the TEC has developed the individual subject areas of study, it is not feasible to indicate the extent to which grouped courses involving related subjects might develop. It is proposed, therefore, that the award of the HTC should be based on the successful completion of either a single course or a series of discrete courses totalling about 600 hours of study beyond the TC/TD stage.

12. The technician who reaches the HTC level should be expected to become involved increasingly in the organisation and control of some industrial activities as he will become, by virtue of his qualifications, the natural leader of a small unit or group. In time, he could well exercise wider responsibilities within his firm. It will be necessary, therefore, for the course to contain an appreciation of the role of the supervisor and the meaning of cost control.

13. Most students with a TD will look towards the posts involving greater theoretical knowledge in support of the technician skills to be exercised. We do not think the needs of these students can be satisfied by the pattern of studies proposed in paragraph 11 for the HTC. Since the engineering technician at this level is becoming increasingly involved with the entire range of techniques, he requires a much broader base than is possible with the present Higher National Certificate course. We, therefore, see his course starting with a common, or almost common, set of broad science and engineering and of mathematical studies to raise to a higher level the pattern of education started in the TD course. To this must be added two other sets of studies. One is an appreciation

of the functions of business, since such a technician would be likely to become involved in cost control and other functions of management and might expect to move into a responsible managerial position as his experience grows. The other, will be specialist studies, in depth or in breadth, pertinent to his developing interests and initial employment. It is in this area of specialist studies where the student will wish to exercise a choice both in terms of subjects and the time at which he studies them. It is proposed that the successful completion of the three component parts should qualify for the award of an HTD. By the end of the HTD course, which we think may require a total time approaching 1200 hours, the technical education of the technician should be regarded as being complete except for the additional studies required to bring him up to date in his technology or to enable him to transfer to different work.

STAGE III

14. The studies to be undertaken post HTC or HTD are an equally important part of the technician's education. Here a modular provision may prove the most appropriate form to meet the varied requirements which arise. Changes of occupation, even within the same firm, may require a study of existing subjects in the HTC or HTD course not previously taken. The introduction of new techniques will call for the provision of new courses of study or major revisions of existing courses. For those moving into supervisory and management posts there will be a progressive need to extend the appreciation started in the HTC or HTD by a series of formal studies. Some students who have progressed via the HTC route will wish to secure an HTD qualification and it should be possible for them to do this by supplementary study which takes account of both previous formal studies and knowledge gained as a result of industrial experience.

ALTERNATIVE ROUTES

15. In paragraph 10 we mentioned students who, having started in the technician route, move across into the craft route. There will also be transfers in the opposite direction. These transfers, they are shown on the left hand side of Fig 2, are not precisely indicated and the term "bridge studies" rather than "bridging courses" is used. Because of the limited number of students at any one time or place and the different stages they may have reached in their craft studies, a common course is unlikely to be feasible or appropriate. Individual study programmes to be followed under tutorial guidance and with aids such as programmed learning may be required.

16. The right hand side of Fig 2 deals with the students who continue their full-time education beyond the age of 16. It is intended that pupils who stay on at school until the age of eighteen should be eligible to enter the technician course structure normally at the second stage. The principles outlined in paragraph 4 should be applied when selecting students from this group for entry into the system. It is appreciated that students will be entering the system at this level with two more years of full time academically directed study behind them than trainee technicians who enter the second stage with TC or TD qualifications. It is assumed that most of the eighteen year old school leavers will enter a HTD or HND course and their future technician education will thus be more academically biased. Nevertheless, it will be necessary for them to obtain some

compensatory industrially biased education by means of a conversion or orientation element before they enter the HTD or HND courses proper, although in some cases it might be possible to provide this within the HTD or HND course itself. Conversion courses should also make it possible for the eighteen year old school leaver to enter the HTC course.

17. In some instances it may be expedient for prospective technicians with an appropriate educational background to continue in full-time education to the age of 18 instead of entering employment at 16 years of age and taking a concurrent TC or TD course. We suggest that for such people a new full-time group course in technological studies should be provided. A possible pattern for this course would have subjects such as communications, mathematics, complementary studies and project work related to a central core dealing with the principles of technology which itself would embrace the relevant scientific principles and fundamentals. Such a course would provide a more suitable alternative preparation for a higher technician course in engineering (e.g. HTD or HND) than is at present given by the study of GCE "A" level subjects. It is appreciated that some students who do not complete such a course and some others with an appropriate educational background might secure employment as engineering technicians when they leave full-time education after 16 years of age. It is recommended that the TEC should consider providing for such people to enter a TC or TD course later than the initial term on condition that adequate arrangements are made for them to make up any technician training and education they may have missed. It is not anticipated that the point of their admission to the course would be later than the commencement of the second year.

HIGHER NATIONAL DIPLOMA AND DEGREE COURSES IN ENGINEERING SUBJECTS

18. Although provision for the Higher National Diploma has been included in Fig 2 it is recognised that the future of this course will depend upon the degree of recognition that will be accorded to the new HTD qualification for entry into engineering degree courses and into a course leading to Part II of the Council of Engineering Institutions' examination. While the HND remains, however, it is envisaged that the performance of students in the TD course will indicate their potential for successful progression to the HND course as well as to a degree course, although it is appreciated that a specified standard of performance will probably be required by the bodies responsible for these courses.

MAIN ROUTES

Figure 1

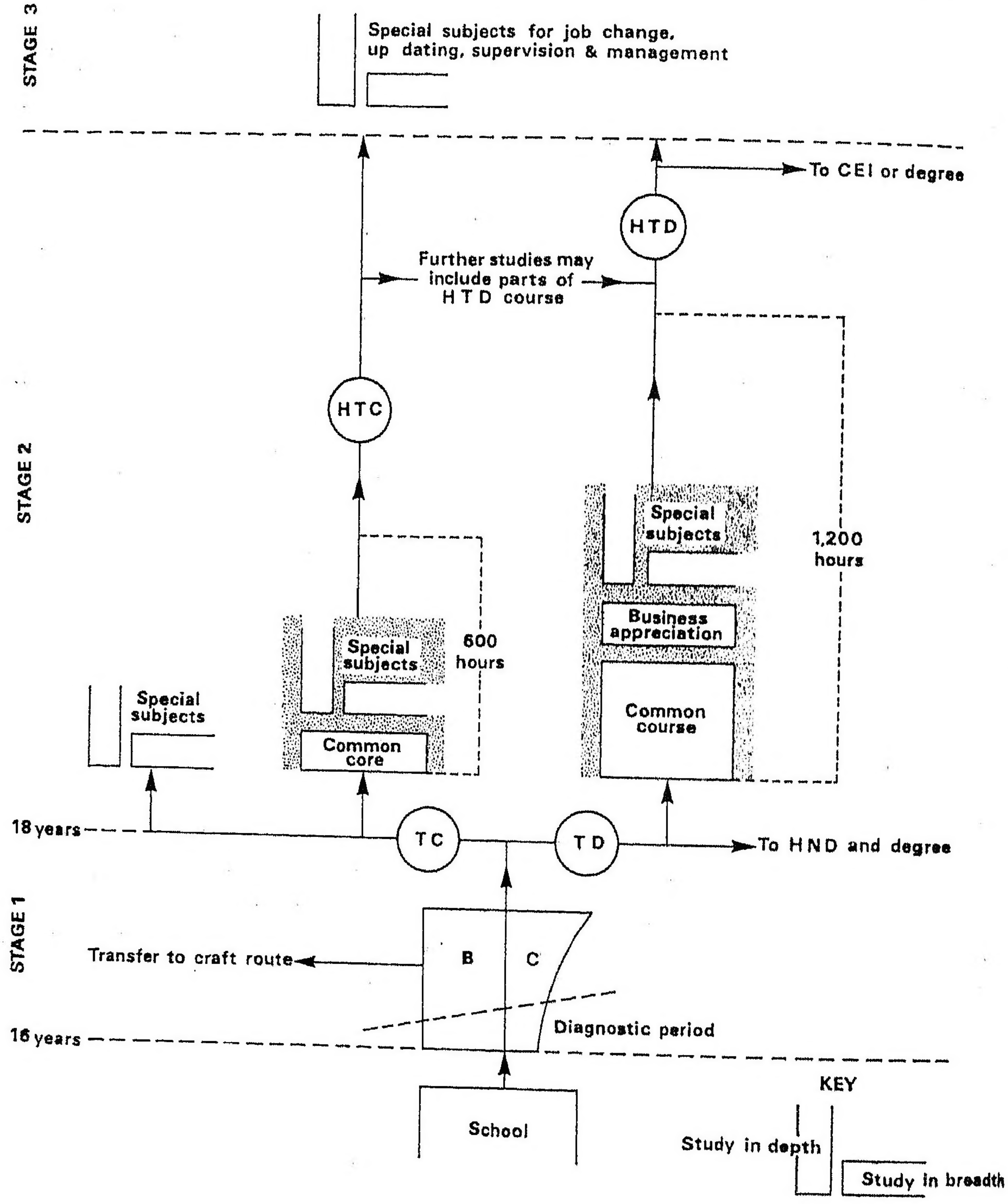
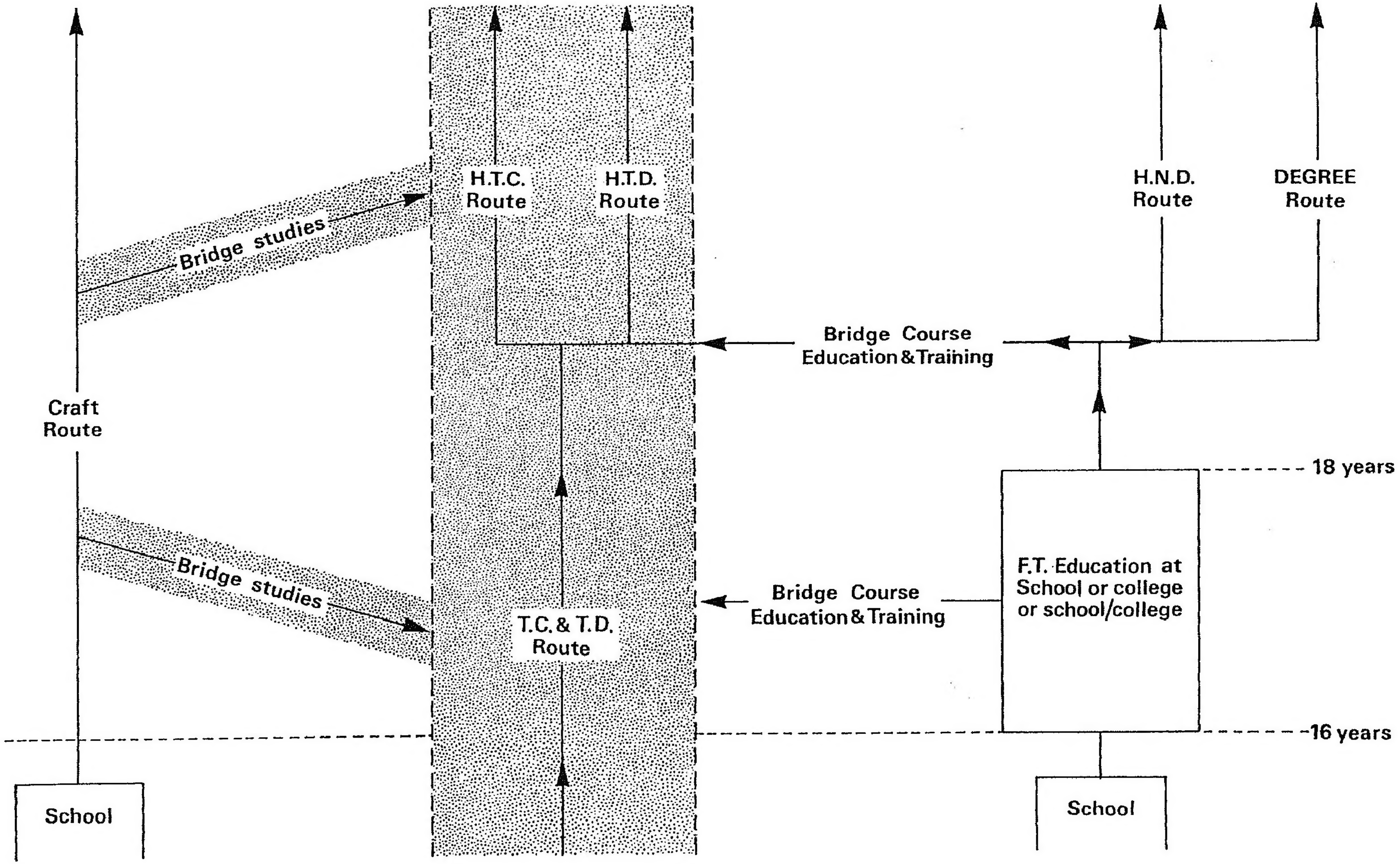


Figure 2

ALTERNATIVE ROUTES

(For students transferring from craft courses and students continuing in full-time education after the age of 16)



APPENDIX No. 8

TECHNICIAN EDUCATION AND TRAINING IN OTHER COUNTRIES

1. In any attempt to determine whether any elements of overseas schemes might usefully be incorporated in our own system of education and training for technicians, it is necessary continually to bear in mind that the British situation is virtually unique. The United Kingdom is a small, heavily populated, highly industrialised country, with excellent internal communications. It possesses some 700 further education establishments in which education at technician level is available. Thus, to an extent which no other country can match, the great majority of trainees are able to live at home and still be within easy reach of their places of employment on the one hand, and of suitable establishments for technical or commercial education on the other. Our system of providing training within industry for four days a week and associated further education in colleges for the other (perhaps augmented by some evening study) is one which geographical considerations deny to most other countries. Only in Germany is there a system which closely resembles our own, although in several other countries a similar system is to be found in areas, normally those where major industrial developments have resulted in heavy concentration of population, with a corresponding concentration of educational and training facilities.

2. Countries where distances are great and where local industrial concentrations are not large enough to permit the provision of a sufficient range of education and training facilities, invariably produce their technicians by means of full-time integrated courses in establishments specially provided for the purpose. A good example of this is Canada, where most technicians (including comparable personnel in the business field) are produced in "Institutes of Technology" through the medium of a three-year (or sometimes a two-year) course of education and training. At the end of this, the successful trainee enters industry as a fully qualified technician—without ever having experienced the industrial situation. There is no doubt that the Canadian Institutes, like the corresponding establishments in a number of european countries, provide excellent courses. They have the great advantage that educational and training programmes can be closely coordinated. Also, the training sequence can be determined entirely in terms of what is desirable, and is not influenced by the availability of particular pieces of equipment, or by the incidence of particular work, as may well be the case when training takes place within industry. The grave disadvantage of this system is, of course, its total divorcement from industrial reality. Although many institutions providing full-time integrated courses of this kind go to considerable lengths to simulate industrial conditions, it is not possible to reproduce the environment of actual production, the urgency associated with meeting contract deadlines, the satisfaction of working in a real industrial situation; nor is there any real substitute for what the French call "l'esprit d'entreprise", the team spirit associated with belonging to a firm, as do technician apprentices who receive their training on the job. It is widely held in British industry that there is a powerful case for putting the trainee into the actual industrial situation at an early stage in his training.

3. The problem of giving adequate and realistic practical training is handled in many different ways in foreign countries. In Denmark and Switzerland, for example, practical experience is a prerequisite for entry to a technician course. Indeed, in Switzerland this involves the satisfactory completion of a craft apprenticeship. In the Netherlands the third year of a four-year course consists of practical work within industry, while in Portugal the full-time institutional

course has to be augmented by at least 180 working days of supervised practical work in industry or in a State enterprise before "graduation" from the Institute s permitted. In the "écoles privées" in France, the entire integrated course, including the educational element, may be carried out within the works, although there are relatively few firms able to provide suitable technician courses of this nature (as distinct from craft courses, which are much more numerous). In Yugoslavia, similar arrangements are to be found in "school centres" which are education and training units attached to firms. Of course, in both these countries the education and the training responsibility is undivided, and not split between two government departments as it is in this country. Thus an "école privée" located within a firm in France has to satisfy the French Ministry of Education in respect of both education and training standards, in just the same way as does a State college offering the same course entirely outside industry.

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